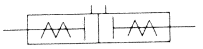
HUMPHREY DUAL CYLINDERS

DOUBLE ACTING, SINGLE ACTING-PUSH AND SINGLE ACTING-PULL TYPES

SYMBOLS

Double Acting (HJDAW)

Single Acting-Push (HJSAW)



Single Acting-Pull (HJTAW)

SPECIFICATIONS

Item		Nominal bore size inch (mm)									
		1/2 (12)	5/8 (16)	3/4 (20)	1 (25)	1 1/4 (32)	1 1/2 (40)	2 (50)	2 1/2 (63)	3 1/4 (80)	4 (100)
Operation		All double & single acting types							All double acting types		
Media		Air									
Pressure – PSI (kgf/cm²)		30 ~ 100 (2 ~ 7)			20 ~ 100 (1.5 ~ 7)			15 ~ 100 (1 ~ 7)			
Temperature °F (°C)		32 ~ 140 (0 ~ 60)									
Operating speeds in./sec. (mm/sec.)	Double	1 ~ 20 (30 ~ 500)						1 ~ 13.5 (30 ~ 350)		1 ~ 10 (30 ~ 250)	
	Single	4 ~ 20 (100 ~ 500)							–		
Bumpers	Double	Not available						Optional			
	Single	Not available							–		
Lubrication		Not required									
Port size		10 ~ 32				1/8 NPT		1/4 NPT		3/8 NPT	

NOTE: Refer to page 56 for mounting and handling information.

WEIGHT

oz. (gf)

Bore nominal (mm)	Base weight				Additional weights to base	
	Double acting type	Single acting types		Stroke 1 or 2 per 1/4"	Sensor	
		push	pull		Double	Single
1/2 (12)	2.6 (75)	3.4 (97.5)	3.4 (95.5)	.3 (8.3)	.21 (6)	.19 (5.5)
5/8 (16)	3.4 (96)	3.7 (103.5)	3.8 (108)	.4 (11.4)	.35 (10)	..35 (10)
3/4 (20)	4.5 (128)	4.9 (137.5)	5.1 (143.5)	.5 (15.2)	.46 (13)	.46 (13)
1 (25)	6.4 (181)	7.0 (199)	7.0 (198)	.7 (21)	1.16 (33)	1.16 (33)
1 1/4 (32)	9.6 (273)	9.5 (269)	10.9 (310)	.9 (24.8)	1.73 (49)	1.69 (48)
1 1/2 (40)	14.2 (402)	14.2 (404)	14.2 (404)	1.3 (35.6)	3.88 (110)	3.88 (110)
2 (50)	22.9 (648)	23.1 (654)	23 (652)	1.7 (48.3)	6.88 (195)	6.88 (195)
2 1/2 (63)	32.2 (914)	–	–	2.1 (59.1)	9.13 (259)	–
3 1/4 (80)	61.4 (1740)	–	–	3.2 (91.4)	13.72 (389)	–
4 (100)	110.8 (3142)	–	–	4.6 (129.5)	25.11 (712)	–

SENSOR SWITCHES (WITH BRACKET)

Model	oz. (gf)
CS9HA-HJDAS	1.41 (40)
CS3HA-HJDAS	1.06 (30)
CS4HA-HJDAS	1.06 (30)
CS5HA-HJDAS	1.06 (30)

COMPUTATION EXAMPLE (in oz.)

Double acting 1" (25mm) bore with magnet.

Stroke 1 = 1", Stroke 2 = 1/4", with four CS3HA-HJDAS mounted.

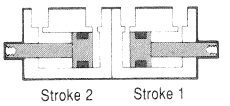
6.4 + (.7 x 4) + (.7 x 1) + 1.16 + (1.06 x 4) = 15.3 oz. (439mm).

PRINCIPLE OF OPERATION

The dual cylinder is constructed of two cylinders connected "back to back."

When mounting via the cylinder body, both strokes can be controlled separately. When mounting via one rod end, a two-step stroke action can be obtained.

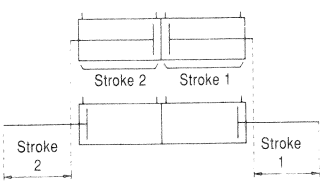
Dual cylinder



BORES AND STROKES

Operation	Nominal bore in. (mm)	Standard Strokes – in.		Maximum stroke
		w/o magnet	w/magnet	
Double	1/2 (12)	1/4, 3/8, 1/2, 5/8, 3/4, 1, 1 1/4	1/2, 5/8, 3/4, 1, 1 1/4	1 1/4
	5/8 (16)			
	3/4 (20)			
	1 (25)	1/4, 1/2, 3/4, 1, 1 1/4, 1 1/2, 2	1/2, 3/4, 1, 1 1/4, 1 1/2, 2	2
	1 1/4 (32)			
	1 1/2 (40)	1/4, 3/8, 1/2, 5/8, 3/4, 1, 1 1/4, 1 1/2, 2, 3, 4	1/2, 5/8, 3/4, 1, 1 1/4, 1 1/2, 2, 3, 4	4
	2 (50)	1/2, 3/4, 1, 1 1/4, 1 1/2, 2, 3, 4	1/2, 3/4, 1, 1 1/4, 1 1/2, 2, 3, 4	4
	2 1/2 (63)			
	3 1/4 (80)			
	4 (100)			
Single	1/2 (12)	1/4, 3/8, 1/2, 5/8, 3/4, 1, 1 1/4	1/2, 5/8, 3/4, 1	1 1/4
	5/8 (16)			
	3/4 (20)			
	1 (25)	1/4, 1/2, 3/4, 1, 1 1/4	1/2, 3/4, 1, 1 1/4	1 1/4
	1 1/4 (32)			
	1 1/2 (40)	1/4, 3/8, 1/2, 5/8, 3/4, 1, 1 1/4	1/2, 5/8, 3/4, 1 1/4	1 1/4
	2 (50)	1/2, 3/4, 1, 1 1/4, 1 1/2	1/2, 3/4, 1, 1 1/4, 1 1/2	1 1/2

NOTES:
See page 56 for non-standard strokes.
Stroke tolerance: +.040"/–.000".
This chart applies to both stroke 1 and stroke 2.



HOW TO ORDER INFORMATION

HJ | DA | W | [ ] | 25 x 1/4 x 1/2 | — | [ ] | — | [ ]

- HJ — **SERIES:** Block cylinder
- DA — **TYPE**
  - **DA:** Double acting
  - **SA:** Single acting - push
  - **TA:** Single acting - pull
- W — Dual cylinder
- [ ] — **OPTIONS**
  - **Blank:** No option
  - **S:** MAGNET[2]
  - **F:** Fluoroelastomer[3]
- 25 x 1/4 x 1/2 — BORE[1] x STROKE 1 x STROKE 2
- [ ] — **ROD OPTIONS**[5]
  - **Blank:** Female rod
  - **B:** Male rod
  - **N:** Plain rod
- [ ] — **Blank:** No bumper
  - **R:** Bumper[4]

NOTE : Ordering strokes over 1", use __"__ /__. Examples: 1"1/4, 2"1/8.

NOTE 1: When ordering bore size, specify by using actual mm bore size.

NOTE 2: Refer to Sensor Section for sensor switch selection and information.

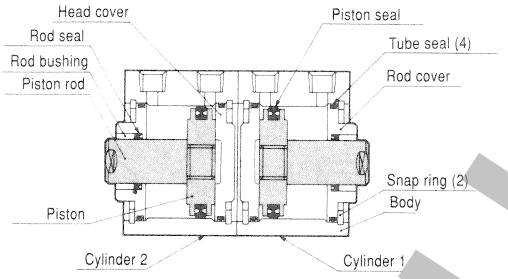
NOTE 3: Fluoroelastomer option not available with Magnet (S) and Bumper (R) options.

NOTE 4: Bumper option only available in bore sizes 1 1/2 (40) thru 4 (100).

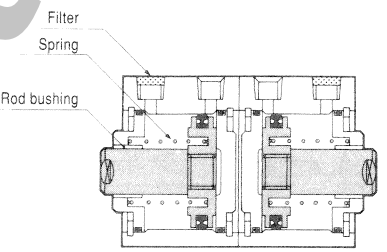
NOTE 5: Refer to page 50 for male rod thread (B) and plain rod (N) information. Rod nuts sold separately.

INNER CONSTRUCTION AND MAJOR PARTS

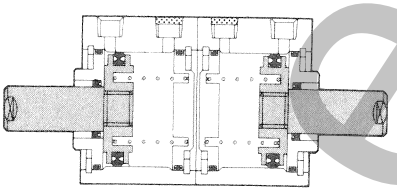
Double acting (HJDAW)



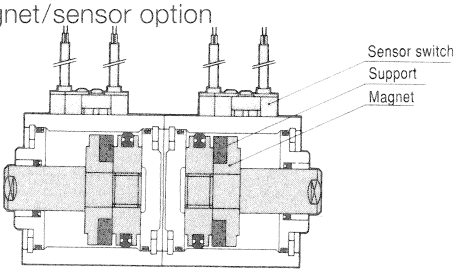
Single acting – push (HJSAW)



Single acting – pull (HJTAW)



Magnet/sensor option



Bumper option

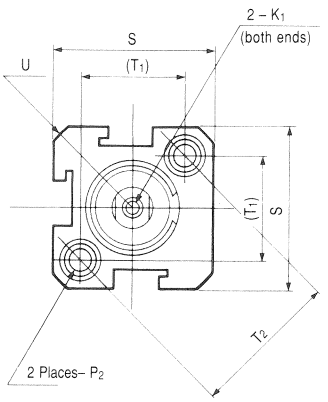
MATERIALS OF MAJOR PARTS

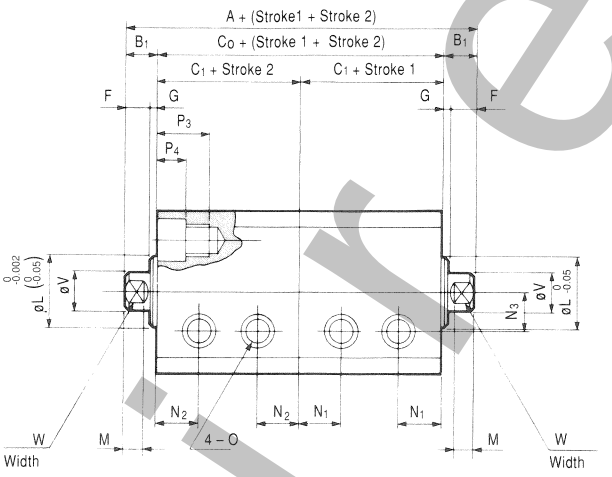
Item	Nominal bore size inch (mm)									
	1/2 (12)	5/8 (16)	3/4 (20)	1 (25)	1 1/4 (32)	1 1/2 (40)	2 (50)	2 1/2 (63)	3 1/4 (80)	4 (100)
Body	Aluminum (anodized)									
Piston	Stainless steel		Aluminum (anodized)[1]							
Piston rod	Stainless steel			Hard steel (chrome plated)[1]						
Seals (piston, rod, tube)	Buna N standard (fluoroelastomer option)									
Rod bushing	None		Double act. – oil permeated bronze, single act. – bronze							
Rod cover	Phosphorous bronze		Aluminum (anodized)							
Head cover	Aluminum (anodized)									
Snap ring	Hard steel									
Spacer	Aluminum (anodized)									
Spring	Music wire							–		
Filter	Porous aluminum							–		
Magnet	Resinous magnet									
Support	Aluminum (anodized)									
Bumper	Buna N									

NOTE[1]: Models HJTAW 20 and 25, and HJSAW 20 and 25 have stainless steel pistons and piston rods.

DOUBLE ACTING (HJDAW)
DOUBLE ACTING WITH MAGNET (HJDAWS)

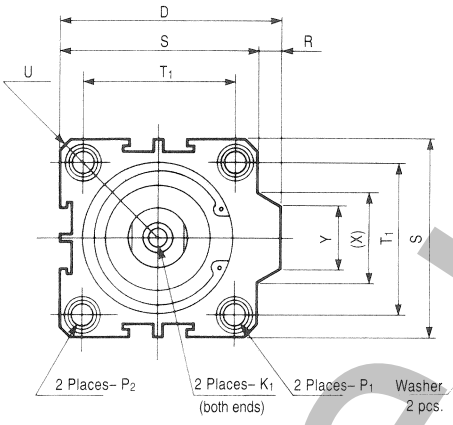
Bores 1/2 (12) & 5/8 (16)

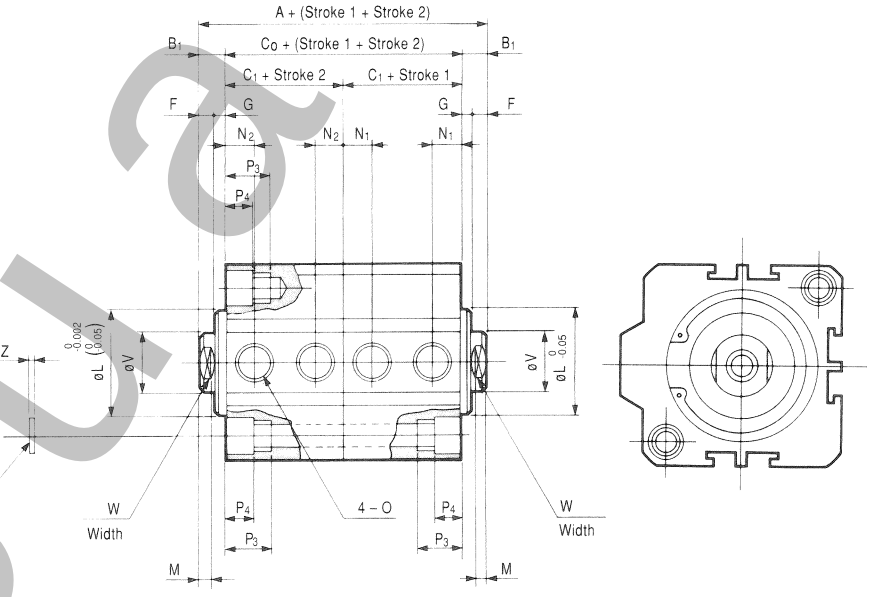




1/2 (12) bore is shown above. Refer to page 56 for non-standard strokes.

Bores 3/4 (20) thru 4 (100)





Refer to page 56 for non-standard strokes.

Bore Nominal in. (mm)	Dimension - inch (mm)								
	HJDAW (without magnet)				HJDAWS (with magnet)				
	A	B_1	C0	C_1	A	B_1	C_0	C_1	D
1/2 (12)	1.732 (44)	.197 (5)	1.339 (34)	.669 (17)	2.032 (51.6)	.197 (5)	1.835 (46.6)	.918 (23.3)	–
5/8 (16)	1.890 (48)	.217 (5.5)	1.457 (37)	.729 (18.5)	2.666 (67.7)	.217 (5.5)	2.449 (62.2)	1.224 (31.1)	–
3/4 (20)	1.969 (50)	.217 (5.5)	1.535 (39)	.768 (19.5)	2.500 (63.5)	.217 (5.5)	2.283 (58)	1.142 (29)	1.417 (36)
1 (25)	2.126 (54)	.236 (6)	1.656 (42)	.827 (21)	2.638 (67)	.236 (6)	2.402 (61)	1.201 (30.5)	1.654 (42)
1 1/4 (32)	2.480 (63)	.276 (7)	1.929 (49)	.965 (24.5)	2.953 (75)	.276 (7)	2.677 (68)	1.339 (34)	1.969 (50)
1 1/2 (40)	2.598 (66)	.276 (7)	2.047 (52)	1.024 (26)	3.071 (78)	.276 (7)	2.795 (71)	1.398 (35.5)	2.303 (58.5)
2 (50)	2.913 (74)	.354 (9)	2.205 (56)	1.102 (28)	3.307 (84)	.354 (9)	2.953 (75)	1.477 (37.5)	2.815 (71.5)
2 1/2 (63)	3.228 (82)	.354 (9)	2.502 (64)	1.260 (32)	3.622 (92)	.354 (9)	3.268 (83)	1.634 (41.5)	3.327 (84.5)
3 1/4 (80)	4.197 (106.6)	.433 (11)	3.331 (84.6)	1.665 (42.3)	4.512 (114.6)	.433 (11)	4.079 (103.6)	2.039 (51.8)	4.094 (104)
4 (100)	5.063 (128.6)	.472 (12)	4.118 (104.6)	2.059 (52.3)	5.339 (135.6)	.472 (12)	4.866 (123.6)	2.433 (61.8)	4.882 (124)

Bore Nominal in. (mm)	Dimension - inch (mm)							
	F	G	K_1	L	M	N_1/N_2	N_3	O
1/2 (12)	.157 (4)	.039 (1)	4-40 UNC x .236 (6) dp.	.433 (11)	.118 (3)	.256 (6.5)	.236 (6)	10-32
5/8 (16)	.157 (4)	.059 (1.5)	4-40 UNC x .236 (6) dp.	.433 (11)	.118 (3)	.276 (7)	.236 (6)	10-32
3/4 (20)	.157 (4)	.059 (1.5)	8-32 UNC x .315 (8) dp.	.591 (15)	.118 (3)	.296 (7.5)	–	10-32
1 (25)	.157 (4)	.079 (2)	10-32 UNF x .394 (10) dp.	.669 (17)	.118 (3)	.315 (8)	–	10-32
1 1/4 (32)	.157 (4)	.118 (3)	1/4-20 UNC x .472 (12) dp.	.866 (22)	.118 (3)	.354 (9)*	–	1/8 NPT
1 1/2 (40)	.157 (4)	.118 (3)	5/16-18 UNC x .472 (12) dp.	1.102 (28)	.118 (3)	.394 (10)*	–	1/8 NPT
2 (50)	.197 (5)	.157 (4)	3/8-16 UNC x .591 (15) dp.	1.496 (38)	.118 (3)	.394 (10)	–	1/4 NPT
2 1/2 (63)	.197 (5)	.157 (4)	3/8-16 UNC x .591 (15) dp.	1.575 (40)	.118 (3)	.472 (12)	–	1/4 NPT
3 1/4 (80)	.236 (6)	.197 (5)	1/2-13 UNC x .787 (20) dp.	1.772 (45)	.157 (4)	.492 (12.5)	–	3/8 NPT
4 (100)	.276 (7)	.197 (5)	3/4-10 UNC x .787 (20) dp.	2.165 (55)	.157 (4)	.669 (17)	–	3/8 NPT

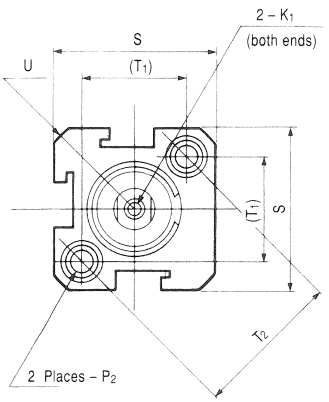
Bore Nominal in. (mm)	Dimension - inch (mm)						
	P_1 - thru holex C bore x thru hole thread	P_2	P_3	P_4	R	S	
1/2 (12)	–	10-32 UNF x .256 (6.5)	.374 (9.5)	.177 (4.5)	–	.984 (25)	
5/8 (16)	–	10-32 UNF x .256 (6.5)	.374 (9.5)	.177 (4.5)	–	1.142 (29)	
3/4 (20)	.138 (3.5) x .256 (6.5) x 10-32 UNF	10-32 UNF x .256 (6.5)	.374 (9.5)	.177 (4.5)	.079 (2)	1.339 (34)	
1 (25)	.181 (4.6) x .315 (8) x 1/4-20 UNC	1/4-20 UNC x .315 (8)	.453 (11.5)	.217 (5.5)	.079 (2)	1.575 (40)	
1 1/4 (32)	.181 (4.6) x .315 (8) x 1/4-20 UNC	1/4-20 UNC x .315 (8)	.453 (11.5)	.217 (5.5)	.236 (6)	1.732 (44)	
1 1/2 (40)	.225 (5.7) x .374 (9.5) x 5/16-18 UNC	5/16-18 UNC x .374 (9.5)	.611 (15.5)	.296 (7.5)	.256 (6.5)	2.047 (52)	
2 (50)	.276 (7) x .433 (11) x 3/8-16 UNC	3/8-16 UNC x .433 (11)	.650 (16.5)	.335 (8.5)	.374 (9.5)	2.441 (62)	
2 1/2 (63)	.276 (7) x .433 (11) x 3/8-16 UNC	3/8-16 UNC x .433 (11)	.660 (16.5)	.335 (8.5)	.374 (9.5)	2.953 (75)	
3 1/4 (80)	.362 (9.2) x .551 (14) x 1/2-13 UNC	1/2-13 UNC x .551 (14)	.886 (22.5)	.414 (10.5)	.394 (10)	3.701 (94)	
4 (100)	.445 (11.3) x .689 (17.5) x 1/2-13 UNC	1/2-13 UNC x .689 (17.5)	1.063 (27)	.512 (13)	.394 (10)	4.488 (114)	

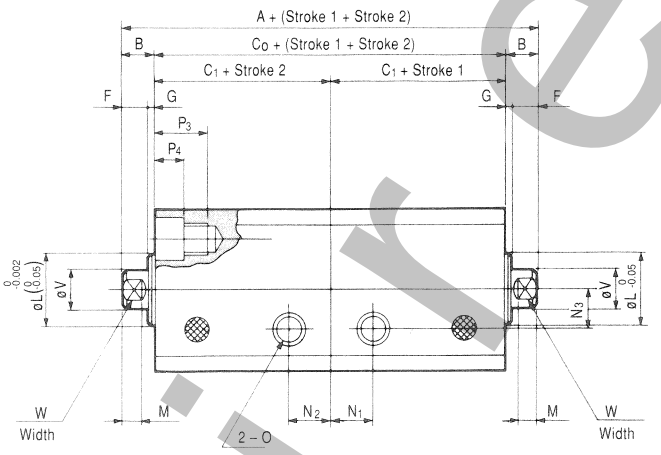
Bore Nominal in. (mm)	Dimension - inch (mm)							
	T_1	T_2	U (Radius)	V	W	X	Y	Z
1/2 (12)	.638 (16.2)	.906 (23)	.630 (16)	.236 (6)	.197 (5)	–	–	–
5/8 (16)	.779 (19.8)	1.102 (28)	.748 (19)	.236 (6)	.197 (5)	–	–	–
3/4 (20)	.945 (24)	–	.866 (22)	.315 (8)	.236 (6)	.484 (12.3)	.394 (10)	.039 (1)
1 (25)	1.102 (28)	–	.984 (25)	.394 (10)	.315 (8)	.484 (12.3)	.394 (10)	.039 (1)
1 1/4 (32)	1.339 (34)	–	1.162 (29.5)	.472 (12)	.394 (10)	.901 (22.9)	.630 (16)	.039 (1)
1 1/2 (40)	1.575 (40)	–	1.378 (35)	.630 (16)	.551 (14)	.926 (23.5)	.630 (16)	.063 (1.6)
2 (50)	1.890 (48)	–	1.614 (41)	.787 (20)	.669 (17)	1.220 (31)	.787 (20)	.063 (1.6)
2 1/2 (63)	2.362 (60)	–	1.969 (50)	.787 (20)	.669 (17)	1.220 (31)	.787 (20)	.063 (1.6)
3 1/4 (80)	2.913 (74)	–	2.441 (62)	.984 (25)	.866 (22)	1.477 (37.5)	1.024 (26)	.063 (1.6)
4 (100)	3.543 (90)	–	2.953 (75)	1.260 (32)	1.063 (27)	1.447 (37.5)	1.024 (26)	.079 (2)

• Dimension is .276 (7) for 1 1/4 (32) bore with 1/4" stroke. Dimension is .287 (7.3) for 1 1/2 (40) bore with 1/4" stroke.
NOTE 1: Please refer to page 50 for male rod thread information.
NOTE 2: Plain rod is same as female rod end except no threads.
NOTE 3: Please refer to page 50 for sensor switch dimensional information.

SINGLE ACTING – PUSH (HJSAW)
SINGLE ACTING – PUSH WITH MAGNET (HJSAWS)

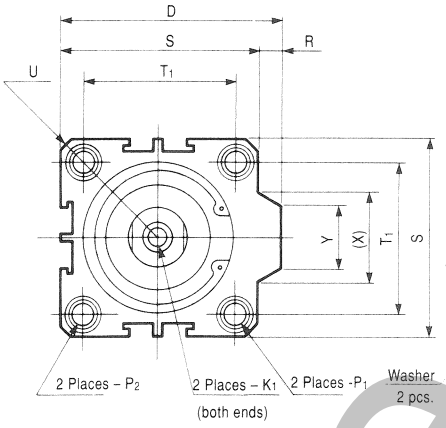
Bores 1/2 (12) & 5/8 (16)

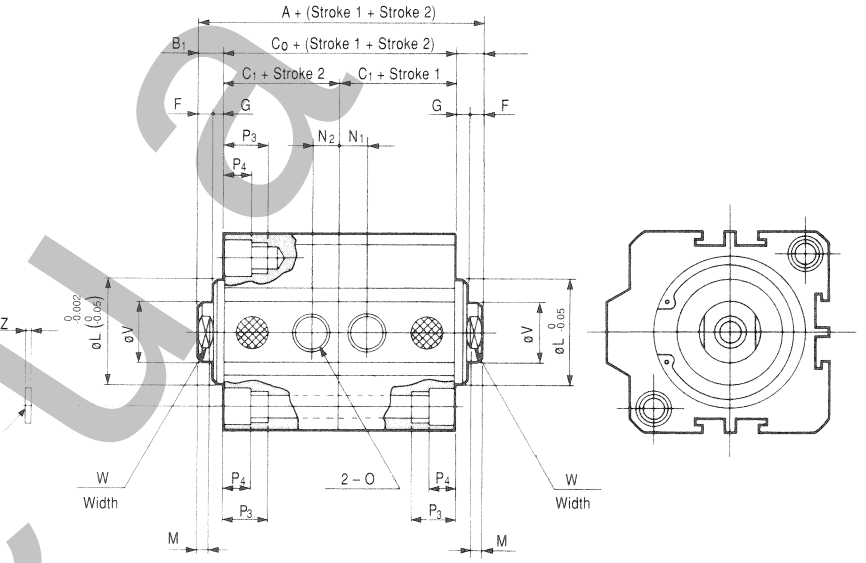




1/2 (12) bore is shown above. Refer to page 56 for non-standard strokes.

Bores 3/4 (20) thru 2 (50)





Refer to page 56 for non-standard strokes.

Bore Nominal	Dimension - inch (mm)								
	HJSAW (without magnet)				HJSAWS (with magnet)				
in. (mm)	A	B_1	C_0	C_1	A	B_1	C_0	C_1	D
1/2 (12)	2.031 (51.6)	.197 (5)	1.835 (46.6)	.917 (23.3)	2.528 (64.2)	.197 (5)	2.331 (59.2)	1.166 (29.6)	–
5/8 (16)	2.169 (55.1)	.217 (5.5)	1.953 (49.6)	.976 (24.8)	2.666 (67.7)	.217 (5.5)	2.449 (62.2)	1.224 (31.1)	–
3/4 (20)	1.969 (50)	.217 (5.5)	1.535 (39)	.768 (19.5)	2.500 (63.5)	.217 (5.5)	2.283 (58)	1.142 (29)	1.417 (36)
1 (25)	2.126 (54)	.236 (6)	1.656 (42)	.827 (21)	2.638 (67)	.236 (6)	2.402 (61)	1.201 (30.5)	1.654 (42)
1 1/4 (32)	2.480 (63)	.276 (7)	1.929 (49)	.965 (24.5)	2.953 (75)	.276 (7)	2.677 (68)	1.339 (34)	1.969 (50)
1 1/2 (40)	2.598 (66)	.276 (7)	2.047 (52)	1.024 (26)	3.071 (78)	.276 (7)	2.795 (71)	1.398 (35.5)	2.303 (58.5)
2 (50)	2.913 (74)	.354 (9)	2.205 (56)	1.102 (28)	3.307 (84)	.354 (9)	2.953 (75)	1.477 (37.5)	2.815 (71.5)

Bore Nominal	Dimension - inch (mm)							
in. (mm)	F	G	K_1	L	M	N_1/N_2	N_3	O
1/2 (12)	.157 (4)	.039 (1)	4-40 UNC x .236 (6) dp.	.433 (11)	.118 (3)	.256 (6.5)	.236 (6)	10-32
5/8 (16)	.157 (4)	.059 (1.5)	4-40 UNC x .236 (6) dp.	.433 (11)	.118 (3)	.276 (7)	.236 (6)	10-32
3/4 (20)	.157 (4)	.059 (1.5)	8-32 UNC x .315 (8) dp.	.591 (15)	.118 (3)	.296 (7.5)	–	10-32
1 (25)	.157 (4)	.079 (2)	10-32 UNF x .394 (10) dp.	.669 (17)	.118 (3)	.315 (8)	–	10-32
1 1/4 (32)	.157 (4)	.118 (3)	1/4-20 UNC x .472 (12) dp.	.866 (22)	.118 (3)	.354 (9)*	–	1/8 NPT
1 1/2 (40)	.157 (4)	.118 (3)	5/16-18 UNC x .472 (12) dp.	1.102 (28)	.118 (3)	.394 (10)*	–	1/8 NPT
2 (50)	.197 (5)	.157 (4)	3/8-16 UNC x .591 (15) dp.	1.496 (38)	.118 (3)	.394 (10)	–	1/4 NPT

Bore Nominal	Dimension - inch (mm)						
in. (mm)	P_1 - thru hole x C bore x thru hole thread	P_2	P_3	P_4	R	S
1/2 (12)	–	10-32 UNF x .256 (6.5)	.374 (9.5)	.177 (4.5)	–	.984 (25)
5/8 (16)	–	10-32 UNF x .256 (6.5)	.374 (9.5)	.177 (4.5)	–	1.142 (29)
3/4 (20)	.138 (3.5) x .256 (6.5) x 10-32 UNF	10-32 UNF x .256 (6.5)	.374 (9.5)	.177 (4.5)	.079 (2)	1.339 (34)
1 (25)	.181 (4.6) x .315 (8) x 1/4-20 UNC	1/4-20 UNC x .315 (8)	.453 (11.5)	.217 (5.5)	.079 (2)	1.575 (40)
1 1/4 (32)	.181 (4.6) x .315 (8) x 1/4-20 UNC	1/4-20 UNC x .315 (8)	.453 (11.5)	.217 (5.5)	.236 (6)	1.732 (44)
1 1/2 (40)	.225 (5.7) x .374 (9.5) x 5/16-18 UNC	5/16-18 UNC x .374 (9.5)	.611 (15.5)	.296 (7.5)	.256 (6.5)	2.047 (52)
2 (50)	.276 (7) x .433 (11) x 3/8-16 UNC	3/8-16 UNC x .433 (11)	.650 (16.5)	.335 (8.5)	.374 (9.5)	2.441 (62)

Bore Nominal	Dimension - inch (mm)							
in. (mm)	T_1	T_2	U (Radius)	V	W	X	Y	Z
1/2 (12)	.638 (16.2)	.906 (23)	.630 (16)	.236 (6)	.197 (5)	–	–	–
5/8 (16)	.779 (19.8)	1.102 (28)	.748 (19)	.236 (6)	.197 (5)	–	–	–
3/4 (20)	.945 (24)	–	.866 (22)	.315 (8)	.236 (6)	.484 (12.3)	.394 (10)	.039 (1)
1 (25)	1.102 (28)	–	.984 (25)	.394 (10)	.315 (8)	.484 (12.3)	.394 (10)	.039 (1)
1 1/4 (32)	1.339 (34)	–	1.162 (29.5)	.472 (12)	.394 (10)	.901 (22.9)	.630 (16)	.039 (1)
1 1/2 (40)	1.575 (40)	–	1.378 (35)	.630 (16)	.551 (14)	.926 (23.5)	.630 (16)	.063 (1.6)
2 (50)	1.890 (48)	–	1.614 (41)	.787 (20)	.669 (17)	1.220 (31)	.787 (20)	.063 (1.6)

• Dimension is .276 (7) for 1 1/4 (32) bore with 1/4" stroke. Dimension is .287 (7.3) for 1 1/2 (40) bore with 1/4" stroke.

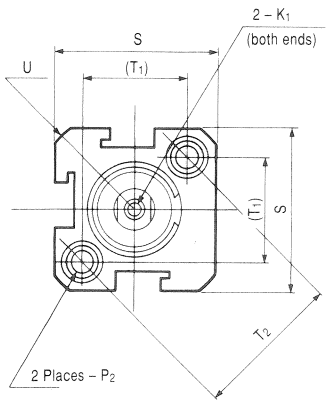
NOTE 1: Please refer to page 50 for male rod thread information.

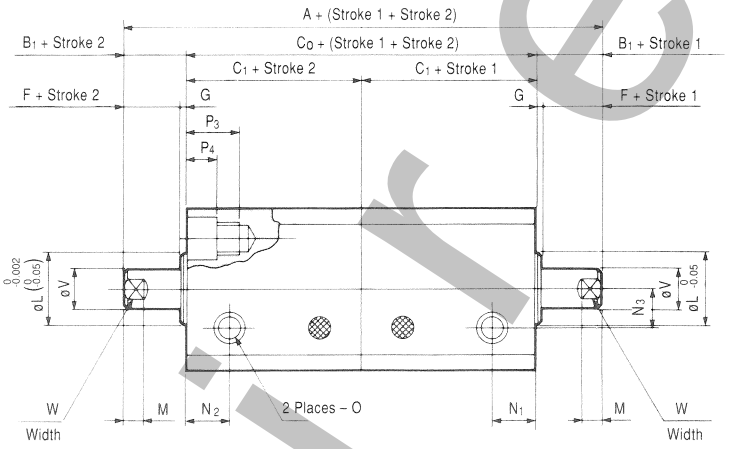
NOTE 2: Plain rod is same as female rod end except no threads.

NOTE 3: Please refer to page 50 for sensor switch dimensional information.

SINGLE ACTING – PULL (HJTAW)
SINGLE ACTING – PULL WITH MAGNET (HJTAWS)

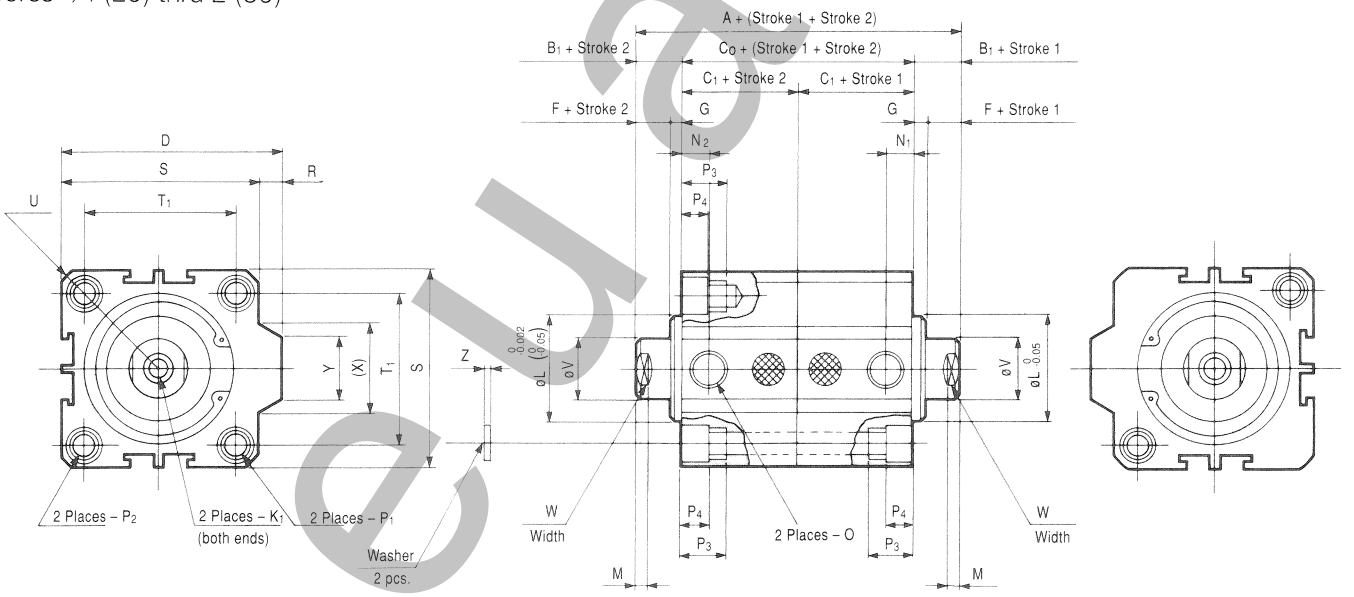
Bores 1/2 (12) & 5/8 (16)





1/2 (12) bore is shown above. Refer to page 56 for non-standard strokes.

Bores 3/4 (20) thru 2 (50)



Refer to page 56 for non-standard strokes.

Bore Nominal in. (mm)	Dimension - inch (mm)								
	HJTAW (without magnet)				HJTAWS (with magnet)				
	A	B_1	C_0	C_1	A	B_1	C_0	C_1	D
1/2 (12)	2.228 (56.6)	.197 (5)	1.835 (46.6)	.917 (23.3)	2.528 (64.2)	.197 (5)	2.331 (59.2)	1.166 (29.6)	–
5/8 (16)	2.169 (55.1)	.217 (5.5)	1.953 (49.6)	.976 (24.8)	2.666 (67.7)	.217 (5.5)	2.449 (62.2)	1.224 (31.1)	–
3/4 (20)	1.969 (50)	.217 (5.5)	1.535 (39)	.768 (19.5)	2.500 (63.5)	.217 (5.5)	2.283 (58)	1.142 (29)	1.417 (36)
1 (25)	2.126 (54)	.236 (6)	1.656 (42)	.827 (21)	2.638 (67)	.236 (6)	2.402 (61)	1.201 (30.5)	1.654 (42)
1 1/4 (32)	2.480 (63)	.276 (7)	1.929 (49)	.965 (24.5)	2.953 (75)	.276 (7)	2.677 (68)	1.339 (34)	1.969 (50)
1 1/2 (40)	2.598 (66)	.276 (7)	2.047 (52)	1.024 (26)	3.071 (78)	.276 (7)	2.795 (71)	1.398 (35.5)	2.303 (58.5)
2 (50)	2.913 (74)	.354 (9)	2.205 (56)	1.102 (28)	3.307 (84)	.354 (9)	2.953 (75)	1.477 (37.5)	2.815 (71.5)

Bore Nominal in. (mm)	Dimension - inch (mm)							
	F	G	K_1	L	M	N_1/N_2	N_3	O
1/2 (12)	.157 (4)	.039 (1)	4-40 UNC x .236 (6) dp.	.433 (11)	.118 (3)	.256 (6.5)	.236 (6)	10-32
5/8 (16)	.157 (4)	.059 (1.5)	4-40 UNC x .236 (6) dp.	.433 (11)	.118 (3)	.276 (7)	.236 (6)	10-32
3/4 (20)	.157 (4)	.059 (1.5)	8-32 UNC x .315 (8) dp.	.591 (15)	.118 (3)	.296 (7.5)	–	10-32
1 (25)	.157 (4)	.079 (2)	10-32 UNF x .394 (10) dp.	.669 (17)	.118 (3)	.315 (8)	–	10-32
1 1/4 (32)	.157 (4)	.118 (3)	1/4-20 UNC x .472 (12) dp.	.866 (22)	.118 (3)	.354 (9)*	–	1/8 NPT
1 1/2 (40)	.157 (4)	.118 (3)	5/16-18 UNC x .472 (12) dp.	1.102 (28)	.118 (3)	.394 (10)*	–	1/8 NPT
2 (50)	.197 (5)	.157 (4)	3/8-16 UNC x .591 (15) dp.	1.496 (38)	.118 (3)	.394 (10)	–	1/4 NPT

Bore Nominal in. (mm)	Dimension - inch (mm)						
	P_1 - thru hole x C bore x thru hole thread	P_2	P_3	P_4	R	S	
1/2 (12)	–	10-32 UNF x .256 (6.5)	.374 (9.5)	.177 (4.5)	–	.984 (25)	
5/8 (16)	–	10-32 UNF x .256 (6.5)	.374 (9.5)	.177 (4.5)	–	1.142 (29)	
3/4 (20)	.138 (3.5) x .256 (6.5) x 10-32 UNF	10-32 UNF x .256 (6.5)	.374 (9.5)	.177 (4.5)	.079 (2)	1.339 (34)	
1 (25)	.181 (4.6) x .315 (8) x 1/4-20 UNC	1/4-20 UNC x .315 (8)	.453 (11.5)	.217 (5.5)	.079 (2)	1.575 (40)	
1 1/4 (32)	.181 (4.6) x .315 (8) x 1/4-20 UNC	1/4-20 UNC x .315 (8)	.453 (11.5)	.217 (5.5)	.236 (6)	1.732 (44)	
1 1/2 (40)	.225 (5.7) x .374 (9.5) x 5/16-18 UNC	5/16-18 UNC x .374 (9.5)	.611 (15.5)	.296 (7.5)	.256 (6.5)	2.047 (52)	
2 (50)	.276 (7) x .433 (11) x 3/8-16 UNC	3/8-16 UNC x .433 (11)	.650 (16.5)	.335 (8.5)	.374 (9.5)	2.441 (62)	

Bore Nominal in. (mm)	Dimension - inch (mm)							
	T_1	T_2	U (Radius)	V	W	X	Y	Z
1/2 (12)	.638 (16.2)	.906 (23)	.630 (16)	.236 (6)	.197 (5)	–	–	–
5/8 (16)	.779 (19.8)	1.102 (28)	.748 (19)	.236 (6)	.197 (5)	–	–	–
3/4 (20)	.945 (24)	–	.866 (22)	.315 (8)	.236 (6)	.484 (12.3)	.394 (10)	.039 (1)
1 (25)	1.102 (28)	–	.984 (25)	.394 (10)	.315 (8)	.484 (12.3)	.394 (10)	.039 (1)
1 1/4 (32)	1.339 (34)	–	1.162 (29.5)	.472 (12)	.394 (10)	.901 (22.9)	.630 (16)	.039 (1)
1 1/2 (40)	1.575 (40)	–	1.378 (35)	.630 (16)	.551 (14)	.926 (23.5)	.630 (16)	.063 (1.6)
2 (50)	1.890 (48)	–	1.614 (41)	.787 (20)	.669 (17)	1.220 (31)	.787 (20)	.063 (1.6)

• Dimension is .276 (7) for 1 1/4 (32) bore with 1/4" stroke. Dimension is .287 (7.3) for 1 1/2 (40) bore with 1/4" stroke.

NOTE 1: Please refer to page 50 for male rod thread information.

NOTE 2: Plain rod is same as female rod end except no threads.

NOTE 3: Please refer to page 50 for sensor switch dimensional information.