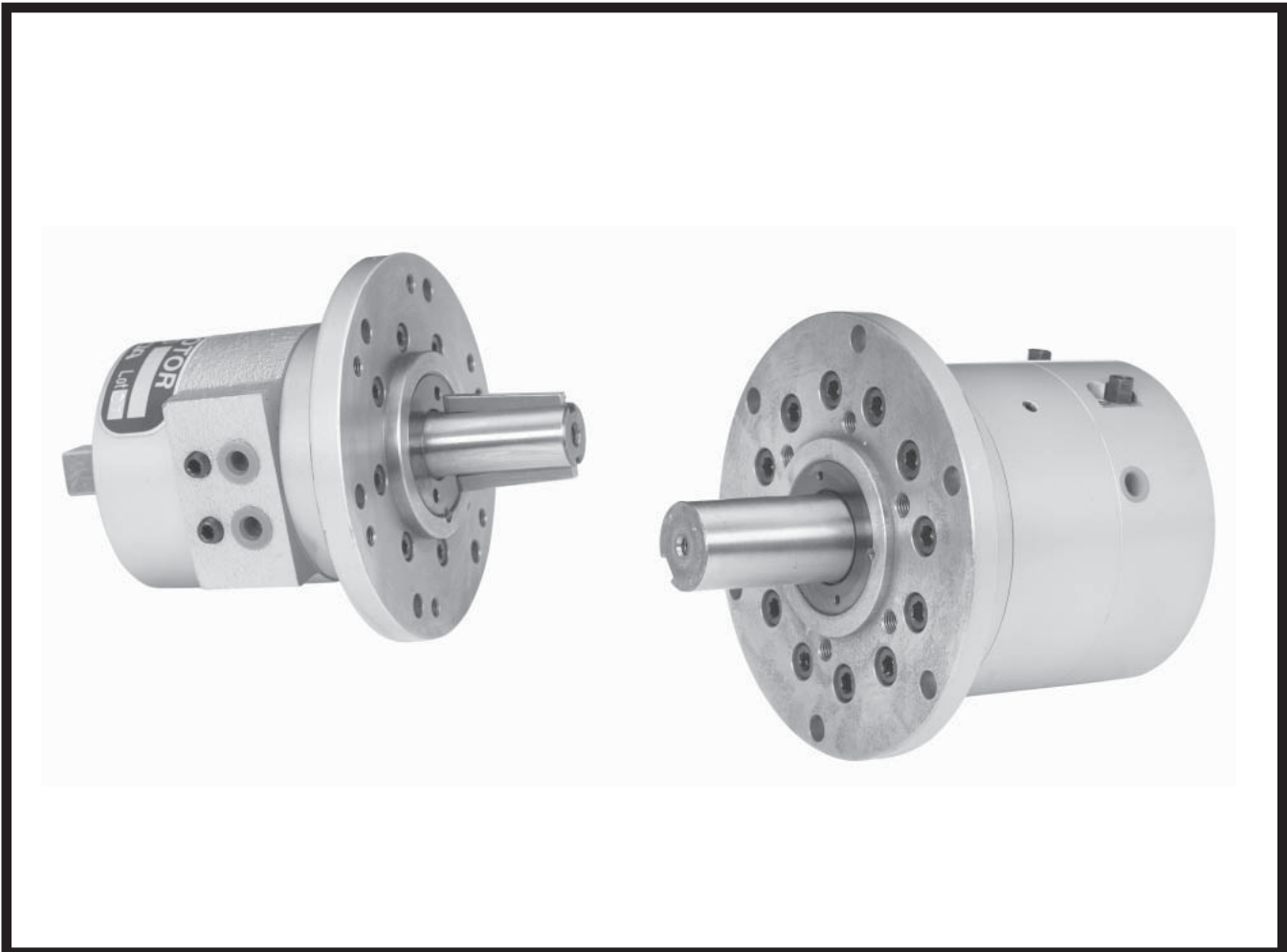




HRN/HRN-C Series

Hydraulic Vane Rotary Actuators



Vane Actuators
HRN
Tork-Mor

Contents

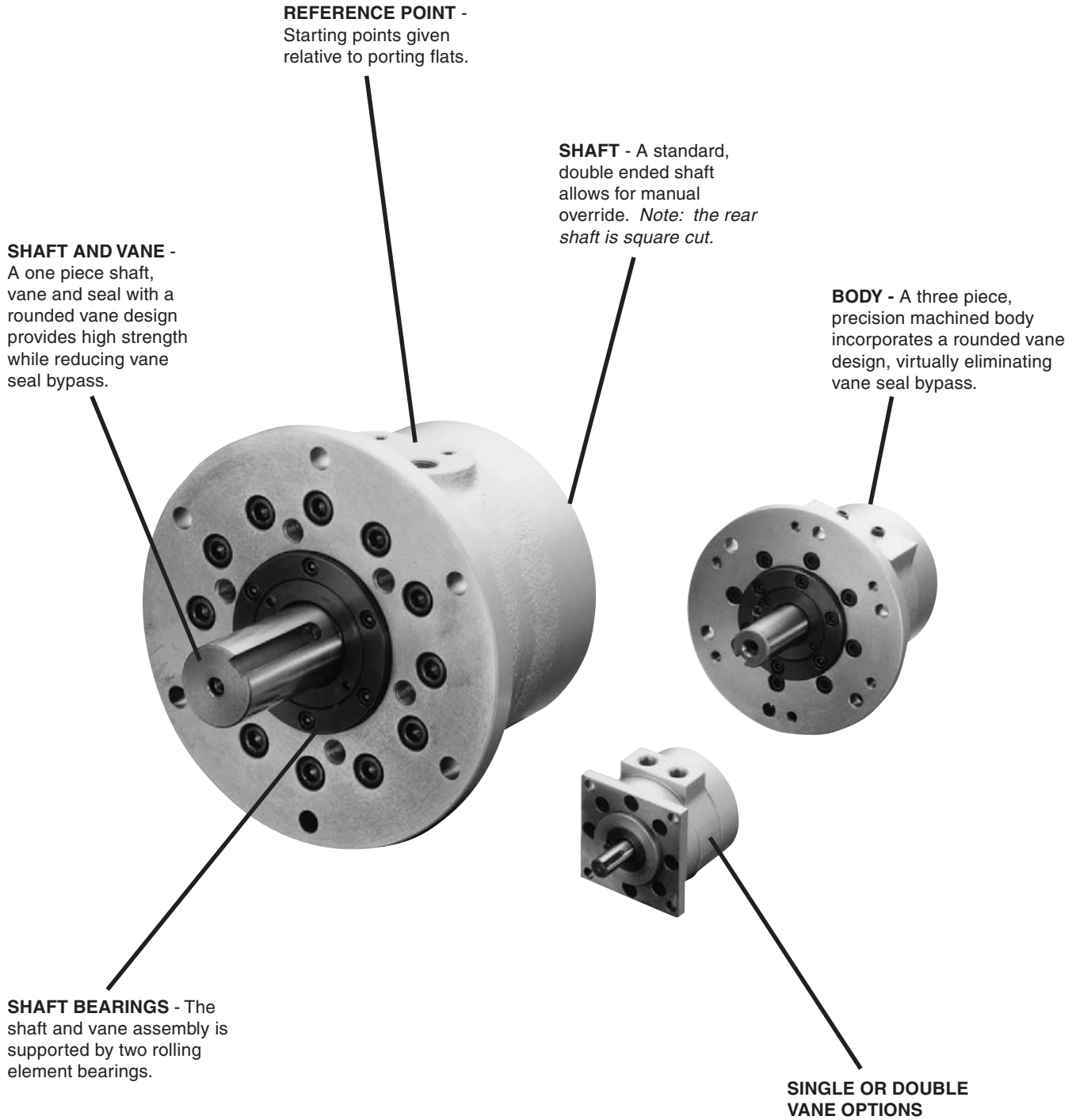
HRN Series

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HRN-C Series

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HRN Series

The HRN Series incorporates a rounded vane design, which provides lower vane seal bypass. The shaft and vane are machined from high strength alloy steel as one piece. The vane seal is molded in a pre-machined groove in order to provide a one piece shaft, vane, and seal assembly for long life and reliability. The standard rear output shaft provides for an easily accessible manual override in the event that hydraulic pressure is lost.

Available options include rotations of 90 degrees and 270 degrees depending on whether the unit is arranged as a double vane or single vane configuration. Reference points (or keyway timing) are provided relative to the port positioning. Large, convenient, front flange with precision pilot diameter allows for concise mounting and easy integration with the customer's application.

Specifications

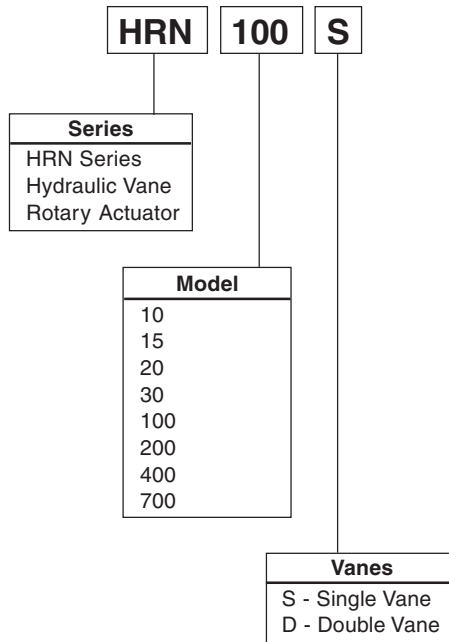
- Rated Operating Pressure: 7 MPa (1000 psi)
- Minimum Operating Pressure: 1 MPa (145 psi)
- Output Torque @ 7 MPa: 10 to 1960 N•m (89 to 17346 in-lb)
- Standard Rotations: 90° to 270°
- Operating Temperature Range: 0°C to 60°C (32°F to 140°F)
- Filtration Requirement: ISO Class 17/14 Cleanliness Level
- Mounting Orientation: Unrestricted
- Standard Keyway Timing: See Figures for Start Position

Quick Reference Data

Model Number		Theoretical Output Torque				Maximum Breakaway Pressure	Unit Weight	
		1.75 MPa (250 psi)	3.50 MPa (500 psi)	5.00 MPa (750 psi)	7.00 MPa (1000 psi)			
		N•m (in-lb)	N•m (in-lb)	N•m (in-lb)	N•m (in-lb)	MPa (psi)	kg (lb)	
Single Vane	HRN10S	2 (17.7)	4 (35.0)	8 (70.8)	10 (89.0)	1.00 (145)	1.00 (2.21)	
	HRN15S	3 (26.6)	8 (70.8)	12 (106.0)	20 (177.0)	1.00 (145)	2.00 (4.41)	
	HRN20S	9 (79.7)	13 (115.0)	19 (168.0)	30 (266.0)	1.00 (145)	3.00 (6.62)	
	HRN30S	12 (106.2)	21 (186.0)	45 (398.0)	60 (531.0)	1.00 (145)	4.30 (9.48)	
	HRN100S	20 (177.0)	55 (487.0)	96 (850.0)	123 (1089.0)	1.00 (145)	10.20 (22.49)	
	HRN200S	40 (354.0)	133 (1177.0)	210 (1859.0)	314 (2779.0)	1.00 (145)	20.00 (44.10)	
	HRN400S	100 (885.0)	200 (1770.0)	420 (3717.0)	539 (4770.0)	1.00 (145)	32.00 (70.56)	
	HRN700S	170 (1504.5)	211 (1867.0)	397 (3513.0)	980 (8673.0)	1.00 (145)	41.00 (90.41)	
Double Vane	HRN10D	3 (26.6)	8 (70.8)	12 (106.2)	20 (177.0)	1.00 (145)	1.00 (2.21)	
	HRN15D	6 (53.1)	18 (142.0)	27 (239.0)	40 (354.0)	1.00 (145)	2.00 (4.41)	
	HRN20D	12 (106.2)	21 (186.0)	45 (398.0)	60 (531.0)	1.00 (145)	3.00 (6.62)	
	HRN30D	21 (185.9)	49 (434.0)	78 (690.0)	117 (1035.0)	1.00 (145)	4.50 (9.92)	
	HRN100D	30 (265.5)	105 (929.0)	160 (1416.0)	245 (2168.0)	1.00 (145)	10.40 (22.93)	
	HRN200D	71 (628.4)	250 (2213.0)	405 (3584.0)	627 (5549.0)	1.00 (145)	20.50 (45.20)	
	HRN400D	220 (1947.0)	440 (3894.0)	760 (6726.0)	1078 (9540.0)	1.00 (145)	33.00 (72.77)	
	HRN700D	320 (2832.0)	730 (6461.0)	1132 (10018.0)	1960 (17346.0)	1.00 (145)	43.00 (94.82)	

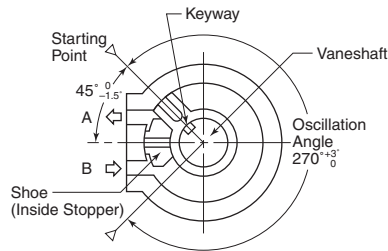
Model Code and Ordering Information

Example: HRN100S



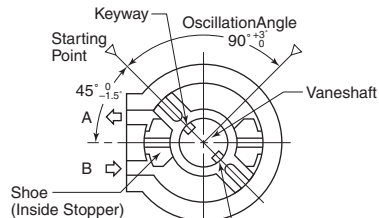
Oscillation Starting Point

**HRN10S, HRN15S, HRN20S,
 HRN30S, HRN100S, HRN200S,
 HRN400S, HRN700S**



Note:
 1. Figures show stroke end position with B port pressurized.
 2. It is a view from shaft-with-key side.

**HRN10D, HRN15D, HRN20D,
 HRN30D, HRN100D, HRN200D,
 HRN400D, HRN700D**



Two Keyways are provided for HRN-30D, 100D and 200D types only

Model No.	Unit Size	HRN10S	HRN15S	HRN20S	HRN30S	HRN100S	HRN200S	HRN400S	HRN700S
Vane		Single Vane							
Rotation	Degree	270							
Rotational Tolerance	Degree	+3 -0							
Reference Point	Degree	45							
Port Size		Rc 1/8			Rc 1/4	Rc 3/8		Rc 1/2	
Minimum Operating Pressure Range	MPa	1.0							
	psi	145.0							
Maximum Operating Pressure Range	MPa	7.0							
	psi	1015.0							
Fluid Temperature Range	°C	0 to 60							
	°F	32 to 140							
Displacement	cm ³	10.0	17.0	24.0	51.0	111.0	221.0	435.0	780.0
Internal Bypass Leakage at 40°C	cm ³ /min	10.0	15.0	20.0	30.0	50.0	100.0	100.0	100.0

Model No.	Unit Size	HRN10D	HRN15D	HRN20D	HRN30D	HRN100D	HRN200D	HRN400D	HRN700D
Vane		Double Vane							
Rotation	Degree	90							
Rotational Tolerance	Degree	+3 -0							
Reference Point	Degree	45							
Port Size		Rc 1/8			Rc 1/4	Rc 3/8		Rc 1/2	
Minimum Operating Pressure Range	MPa	1.0							
	psi	145.0							
Maximum Operating Pressure Range	MPa	7.0							
	psi	1015.0							
Fluid Temperature Range	°C	0 to 60							
	°F	32 to 140							
Displacement	cm ³	6.5	11.0	16.0	34.0	74.0	147.0	290.0	520.0
Internal Bypass Leakage at 40°C	cm ³ /min	20.0	30.0	40.0	60.0	100.0	200.0	200.0	200.0

Vane Actuators
HRN
Tork-Mor

Kinetic Energy Ratings and Bearing Load Capacities

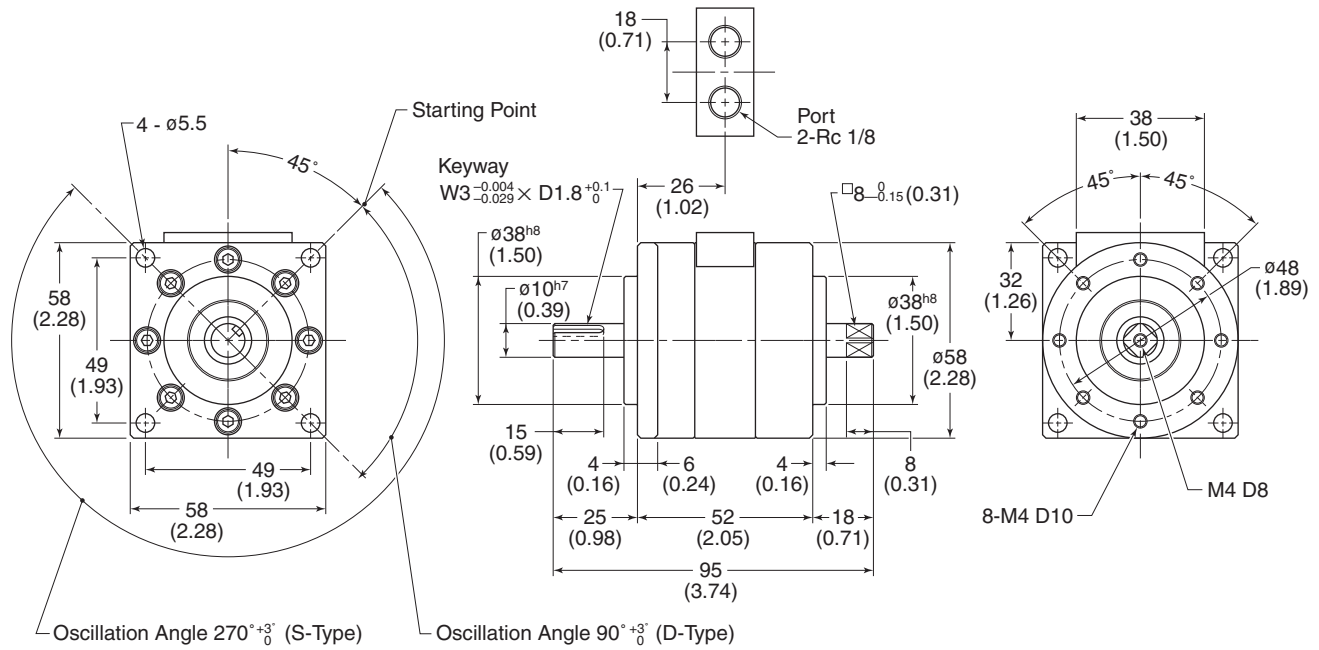
Model Number	Bearing Load Capacities				Maximum Inertia Energy Rating	
	Thrust Load		Radial Load		J	in-lb
	N	lb	N	lb		
HRN10	4.9	1.1	9.8	2.2	0.013	0.12
HRN15	9.8	2.2	19.6	4.4	0.025	0.22
HRN20	24.5	5.5	49	11.0	0.046	0.41
HRN30	39.2	8.8	78.4	17.6	0.088	0.78
HRN100	68.6	15.4	147.0	33.0	0.255	2.26
HRN200	137.2	30.8	294.0	66.1	0.510	4.51
HRN400	166.6	37.5	343.0	77.1	0.755	6.68
HRN700	166.6	37.5	343.0	77.1	0.911	8.06

Note: The allowable inertia energy is applicable when the load is installed on the keyed input shaft.

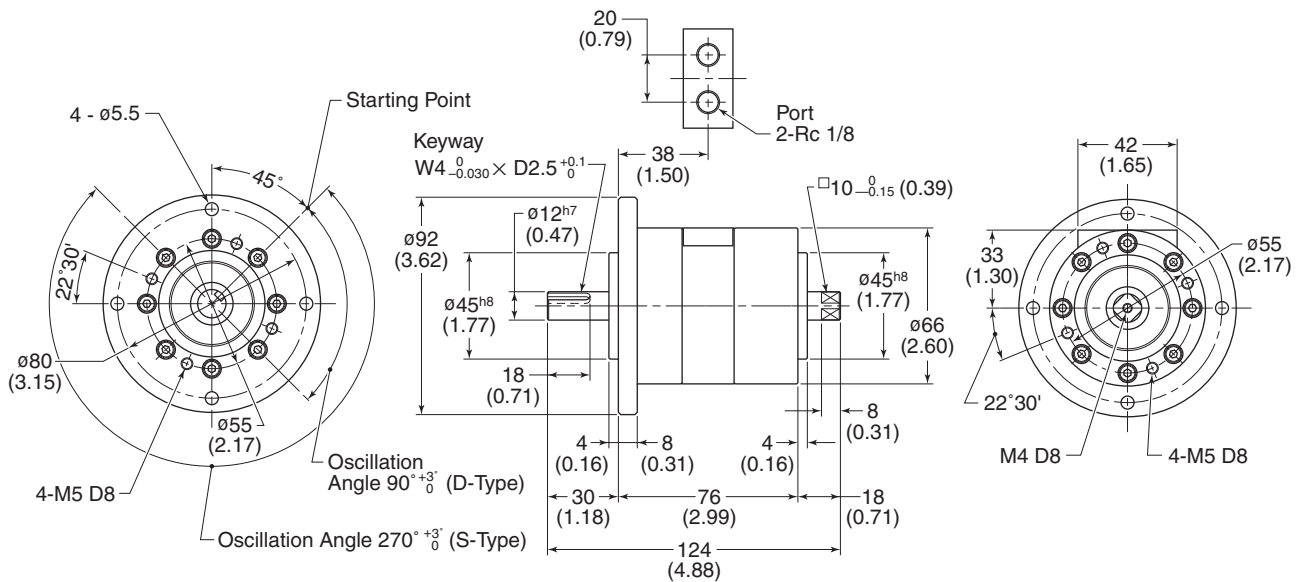
Caution: Operation of actuator at conditions of excessive inertia energy may damage the actuator. See Engineering Guidelines section for selection criteria.



HRN10S/D

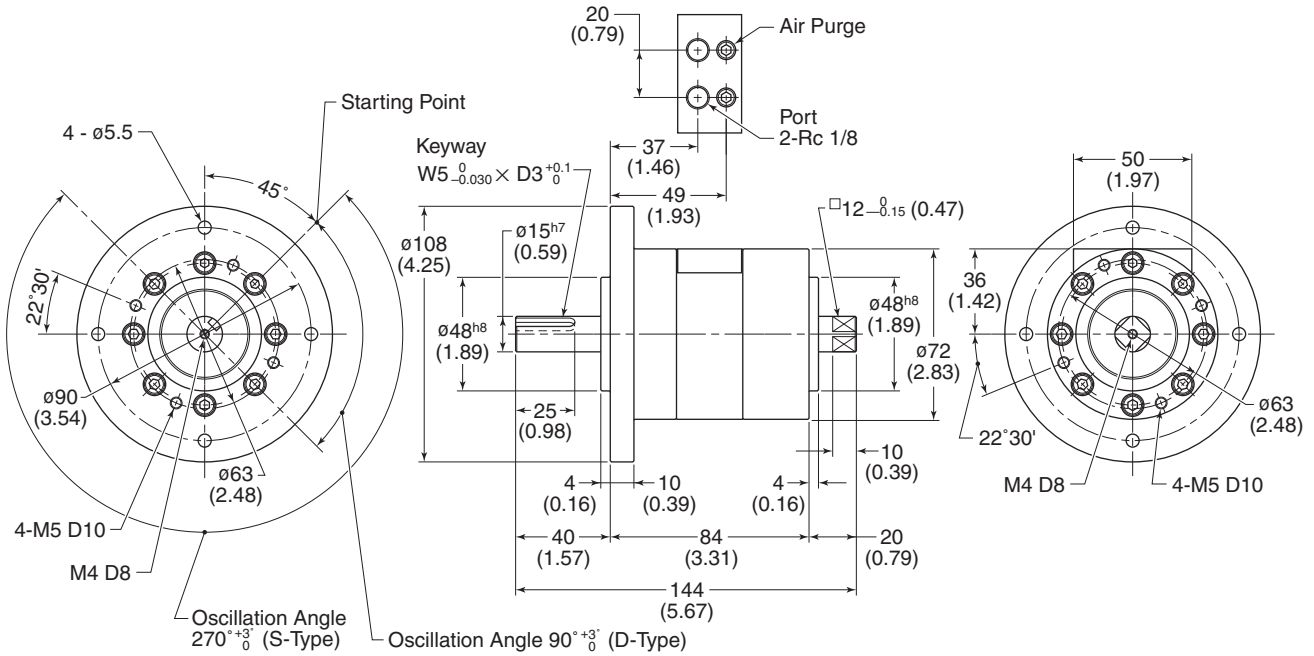


HRN15S/D



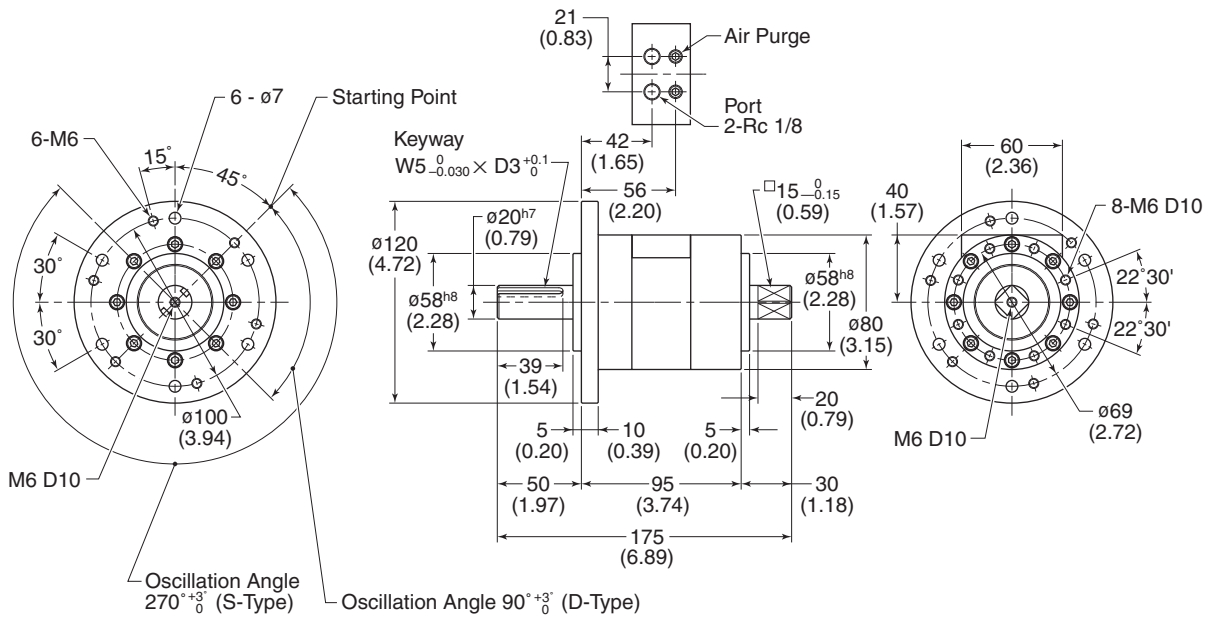
Dimensions are in mm (Inches)

HRN20S/D



Vane Actuators
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 Torq-Mor

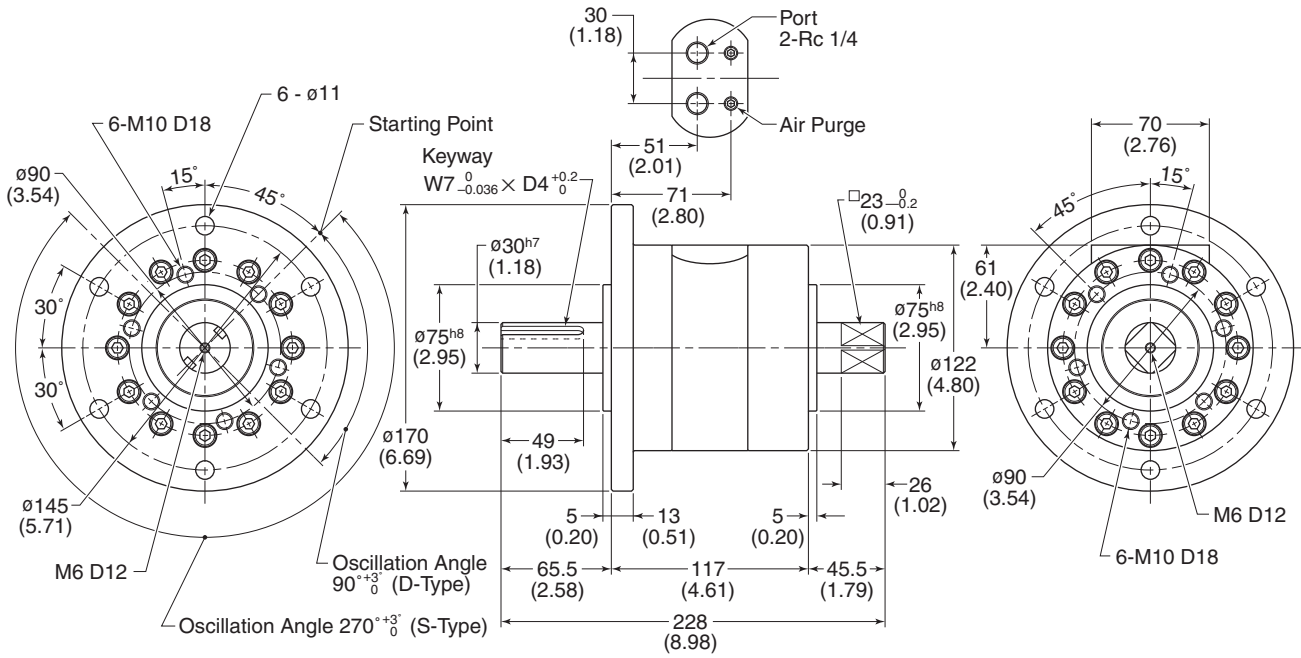
HRN30S/D



Note: For Double Vane, 2 Keyways are Provided

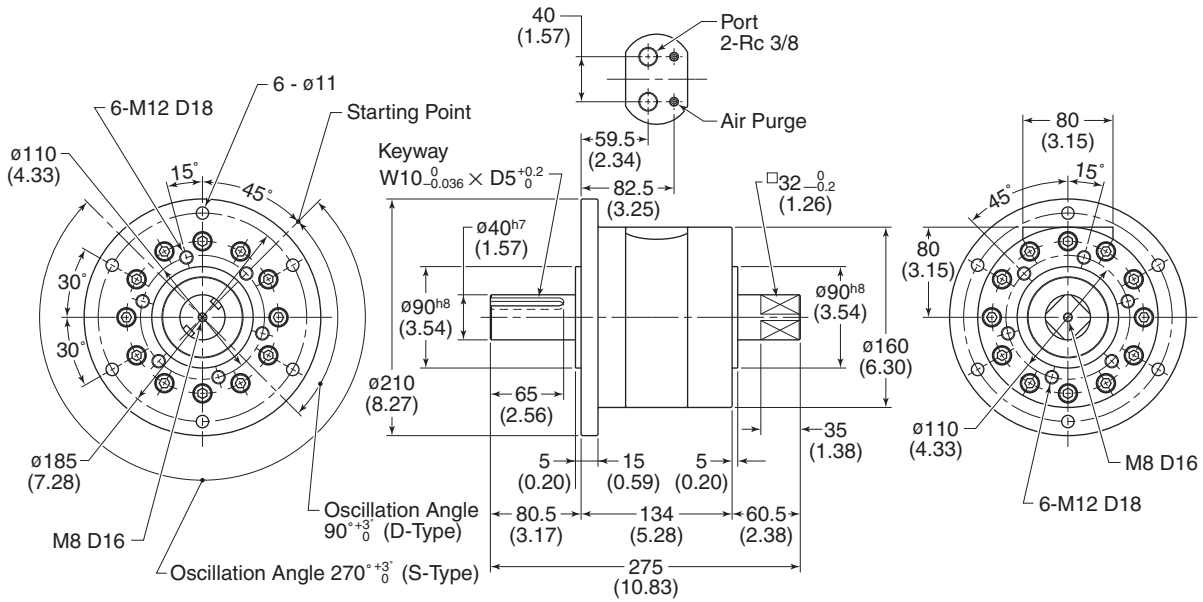
Dimensions are in mm (Inches)

HRN100S/D



Note: For Double Vane, 2 Keyways are Provided

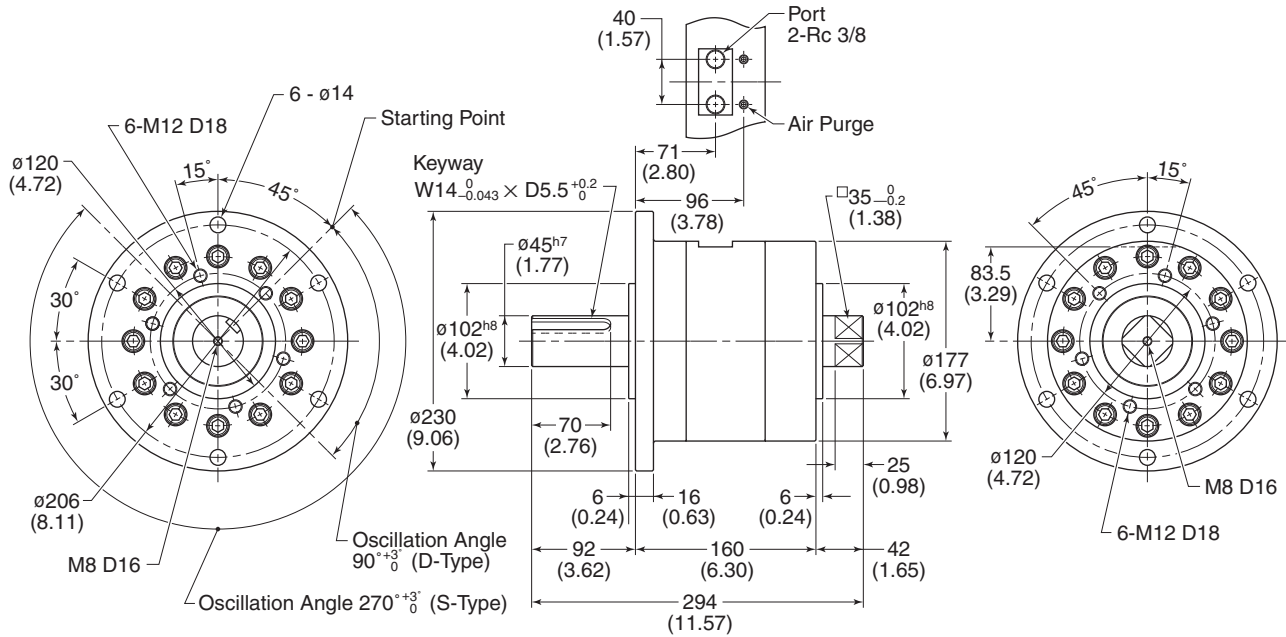
HRN200S/D



Note: For Double Vane, 2 Keyways are Provided

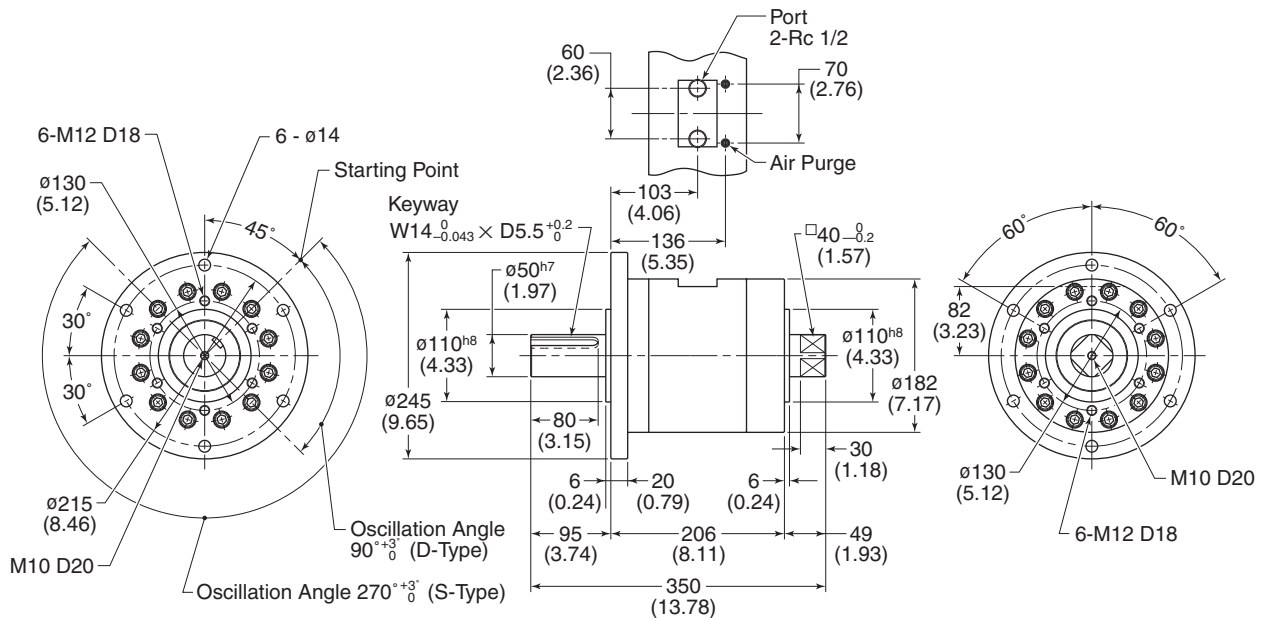
Dimensions are in mm (Inches)

HRN400S/D

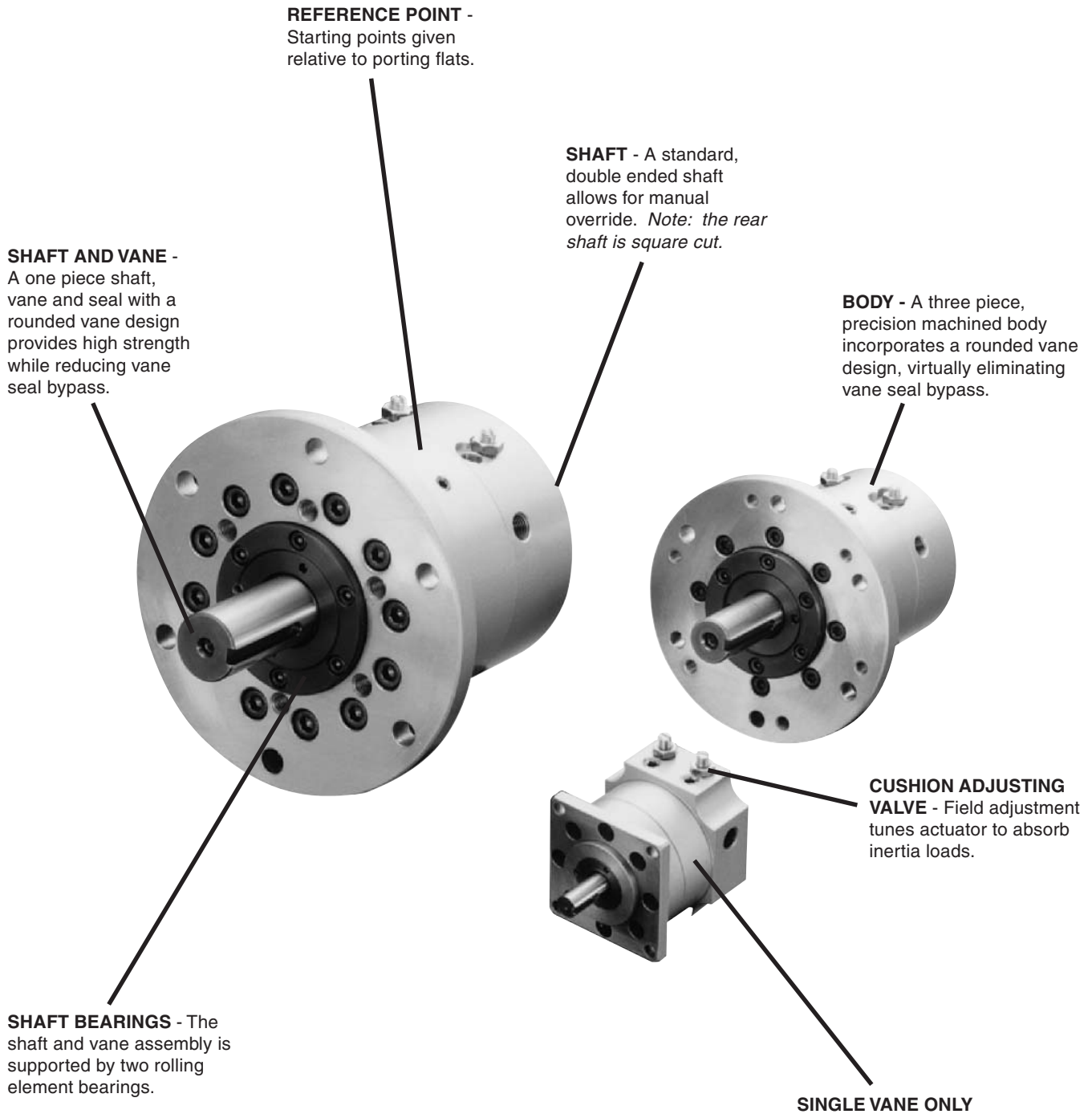


Vane Actuators
HRN
 Torq-Mor

HRN700S/D



Dimensions are in mm (Inches)



HRN-C Series

The HRN-C Series provides an additional range of vane actuator technology. Unique cushion options are available for applications where control of high inertia loads is critical. The actuator incorporates load deceleration cushions which act over the last 20 to 25 degrees of rotation. These are field adjustable and can be selected to meet varying rotational speeds and loading.

The HRN-C Series also incorporates a rounded vane design, which provides lower vane seal bypass. The shaft and vane are machined from high strength alloy steel as one piece. The vane seal is molded in a pre-machined groove in order to provide a one piece shaft, vane, and seal assembly for long life and reliability. The standard rear output shaft provides for an easily accessible manual override in the event that hydraulic pressure is lost.

Available options include rotations of 90 degrees and 180 degrees with the unit configured as a single vane arrangement. Reference points (or keyway timing) are provided relative to the port positioning. Large, convenient, front flange with precision pilot diameter allows for concise mounting and easy integration with the customer's application.

Specifications

- Rated Operating Pressure: 7 MPa (1000 psi)
- Minimum Operating Pressure: 1 MPa (145 psi)
- Output Torque @ 7 MPa: 10 to 1960 N•m (89 to 17346 in-lb)
- Standard Rotations: 90° to 270°
- Operating Temperature Range: 0°C to 60°C (32°F to 140°F)
- Filtration Requirement: ISO Class 17/14 Cleanliness Level
- Mounting Orientation: Unrestricted
- Standard Keyway Timing: See Figures for Start Position

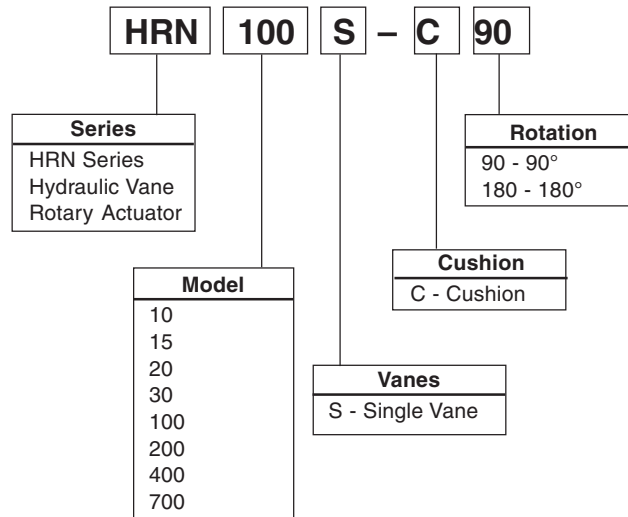
Vane Actuators
HRN-C
Tork-Mor

Quick Reference Data

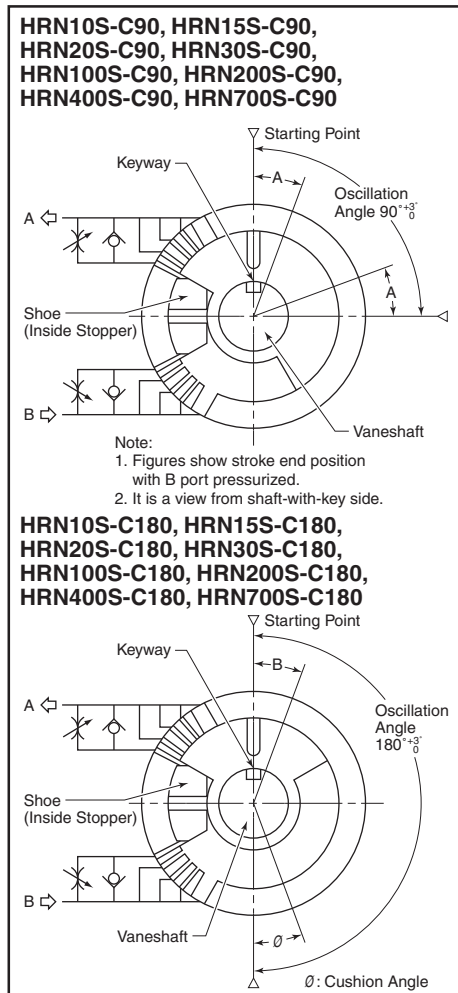
Model Number		Theoretical Output Torque				Maximum Breakaway Pressure	Unit Weight	
		1.75 MPa (250 psi)	3.50 MPa (500 psi)	5.00 MPa (750 psi)	7.00 MPa (1000 psi)			
		N•m (in-lb)	N•m (in-lb)	N•m (in-lb)	N•m (in-lb)	MPa (psi)	kg (lb)	
Single Vane	HRN10S-C	2 (17.7)	5 (44.3)	7 (62.0)	10 (88.5)	1.00 (145)	1.20 (2.65)	
	HRN15S-C	3 (26.6)	8 (70.8)	13 (115.1)	20 (177.0)	1.00 (145)	2.40 (5.29)	
	HRN20S-C	8 (70.8)	13 (115.1)	23 (203.6)	29 (256.7)	1.00 (145)	3.30 (7.28)	
	HRN30S-C	10 (88.5)	26 (230.1)	38 (336.3)	58 (513.3)	1.00 (145)	4.70 (10.36)	
	HRN100S-C	23 (203.6)	56 (495.6)	92 (814.2)	123 (1088.6)	1.00 (145)	13.50 (29.77)	
	HRN200S-C	45 (398.3)	124 (1097.4)	212 (1876.2)	314 (2778.9)	1.00 (145)	25.70 (56.67)	
	HRN400S-C	170 (1504.5)	250 (2212.5)	398 (3522.3)	539 (4770.2)	1.00 (145)	34.00 (74.97)	
	HRN700S-C	201 (1778.9)	410 (3628.5)	579 (5124.2)	1078 (9540.3)	1.00 (145)	44.00 (97.02)	

Model Code and Ordering Information

Example: HRN100S-C90



Oscillation Starting Point



Model No.	Unit Size	HRN10S-C		HRN15S-C		HRN20S-C		HRN30S-C	
Vane		Single Vane							
Rotation	Degree	90	180	90	180	90	180	90	180
Rotational Tolerance	Degree	+3 -0							
Reference Point	Degree	90							
Port Size		Rc 1/8							
Operating Pressure Range	MPa	1.0 to 7.0							
	psi	145.0 to 1015.0							
Temperature Range	°C	0 to 60							
	°F	32 to 140							
Displacement	cm ³	6.5	3.3	11.0	5.5	16.0	8.0	34.0	17.0
	in ³	0.40	0.20	0.67	0.30	0.98	0.49	2.07	1.04
Internal Bypass Leakage at 40°C	cm ³ /min	10		15		20		30	
Maximum Moment of Inertia	in-lb	8.5		17.0		25.5		50.9	
Maximum Inrush Angular Velocity	Radian/s	10.4720							
	Degree/s	600							
Cushion Angle	Radian	0.3491			0.4363				
	Degree	20			25				
Oscillating Angle Before Cushioning	Radian	1.2217	2.7925	1.1345	2.7053	1.1345	2.7053	1.1345	2.7053
	Degree	70	160	65	155	65	155	65	155

Model No.	Unit Size	HRN100S-C		HRN200S-C		HRN400S-C		HRN700S-C	
Vane		Single Vane							
Rotation	Degree	90	180	90	180	90	180	90	180
Rotational Tolerance	Degree	+3 -0							
Reference Point	Degree	90							
Port Size		Rc 1/4		Rc 3/8			Rc 1/2		
Operating Pressure Range	MPa	1.0 to 7.0							
	psi	145.0 to 1015.0							
Temperature Range	°C	0 to 60							
	°F	32 to 140							
Displacement	cm ³	74.0	37.0	147.0	73.5	290.0	145.0	520.0	260.0
	in ³	4.52	2.26	8.97	4.49	17.70	8.85	31.70	15.90
Internal Bypass Leakage at 40°C	cm ³ /min	50		100		100		100	
Maximum Moment of Inertia	in-lb	127.3		339.5		594.3		1188.0	
Maximum Inrush Angular Velocity	Radian/s	8.7266		6.9813		5.2360		4.3633	
	Degree/s	500		400		300		250	
Cushion Angle	Radian	0.4363							
	Degree	25							
Oscillating Angle Before Cushioning	Radian	1.1345	2.7053	1.1345	2.7053	1.1345	2.7053	1.1345	2.7053
	Degree	65	155	65	155	65	155	65	155

Vane Actuators
HRN-C
 Torq-Mor

Kinetic Energy Ratings and Bearing Load Capacities

Model Number	Bearing Load Capacities				Maximum Inertia Energy Rating	
	Thrust Load		Radial Load		J	in-lb
	N	lb	N	lb		
HRN10S-C	4.9	1.1	9.8	2.0	0.013	0.12
HRN15S-C	9.8	2.2	19.6	4.0	0.025	0.22
HRN20S-C	24.5	5.5	49.0	11.0	0.046	0.41
HRN30S-C	39.2	8.8	78.4	18.0	0.088	0.78
HRN100S-C	68.6	15.4	147.0	33.0	0.260	2.26
HRN200S-C	137.2	30.8	294.0	66.0	0.510	4.51
HRN400S-C	166.6	37.5	343.0	77.0	0.760	6.68
HRN700S-C	166.6	37.5	343.0	77.0	0.910	8.06

Note: The allowable inertia energy is applicable when the load is installed on the keyed input shaft.

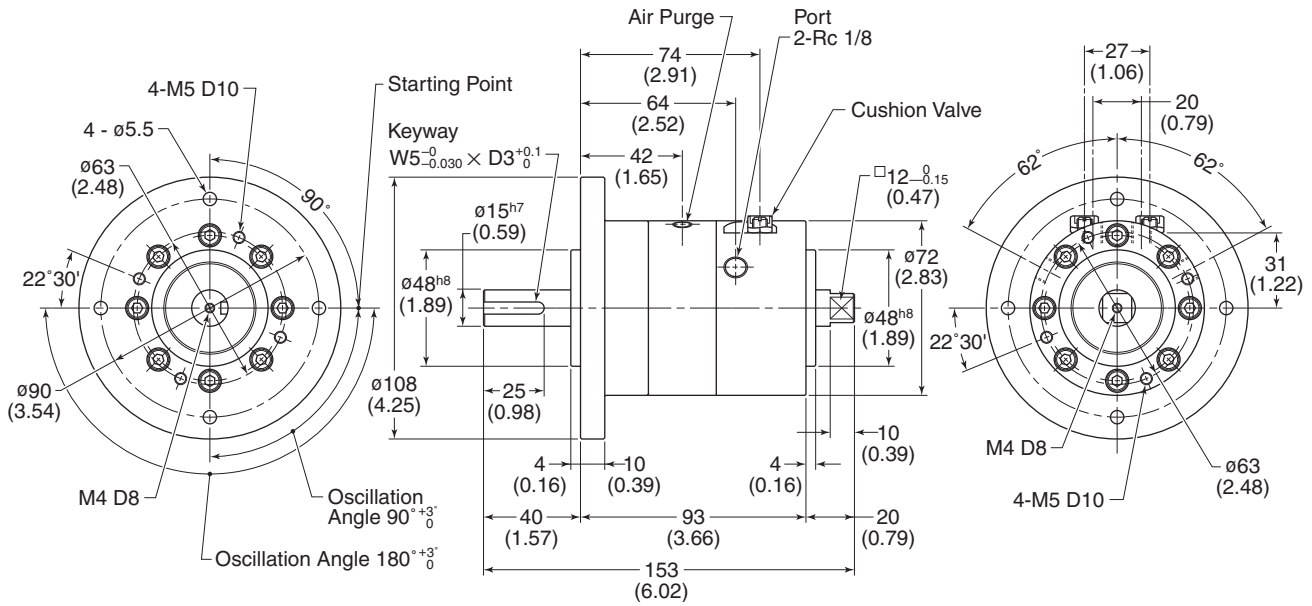
Maximum Absorbed Energy

Model Number	Maximum Absorbed Energy J (in-lb)					
	Operating Pressure MPa (psi)					
	1.96 (284)	2.94 (426)	3.92 (569)	4.90 (710)	5.88 (853)	6.86 (995)
HRN10S-C	2.06 (18.23)	1.76 (15.58)	1.47 (13.01)	1.18 (10.44)	0.88 (7.79)	0.59 (5.22)
HRN15S-C	4.80 (42.48)	4.12 (36.46)	3.43 (30.36)	2.74 (24.25)	2.06 (18.23)	1.37 (12.12)
HRN20S-C	7.55 (66.82)	6.47 (57.26)	5.39 (47.70)	4.31 (38.14)	3.23 (28.59)	2.16 (19.12)
HRN30S-C	15.09 (133.55)	12.94 (114.52)	10.78 (95.40)	8.62 (76.29)	6.47 (57.26)	4.31 (38.14)
HRN100S-C	30.87 (273.20)	26.46 (234.17)	22.05 (195.14)	17.64 (156.11)	13.23 (117.09)	8.62 (76.29)
HRN200S-C	78.89 (698.18)	67.62 (598.44)	56.35 (498.70)	45.08 (398.96)	33.81 (299.22)	22.54 (199.48)
HRN400S-C	137.20 (1214.22)	117.60 (1040.76)	98.00 (867.30)	78.40 (693.84)	58.80 (520.38)	39.20 (346.92)
HRN700S-C	250.39 (2215.95)	214.62 (1899.39)	178.85 (1582.82)	143.08 (1266.26)	107.31 (949.69)	71.54 (633.13)

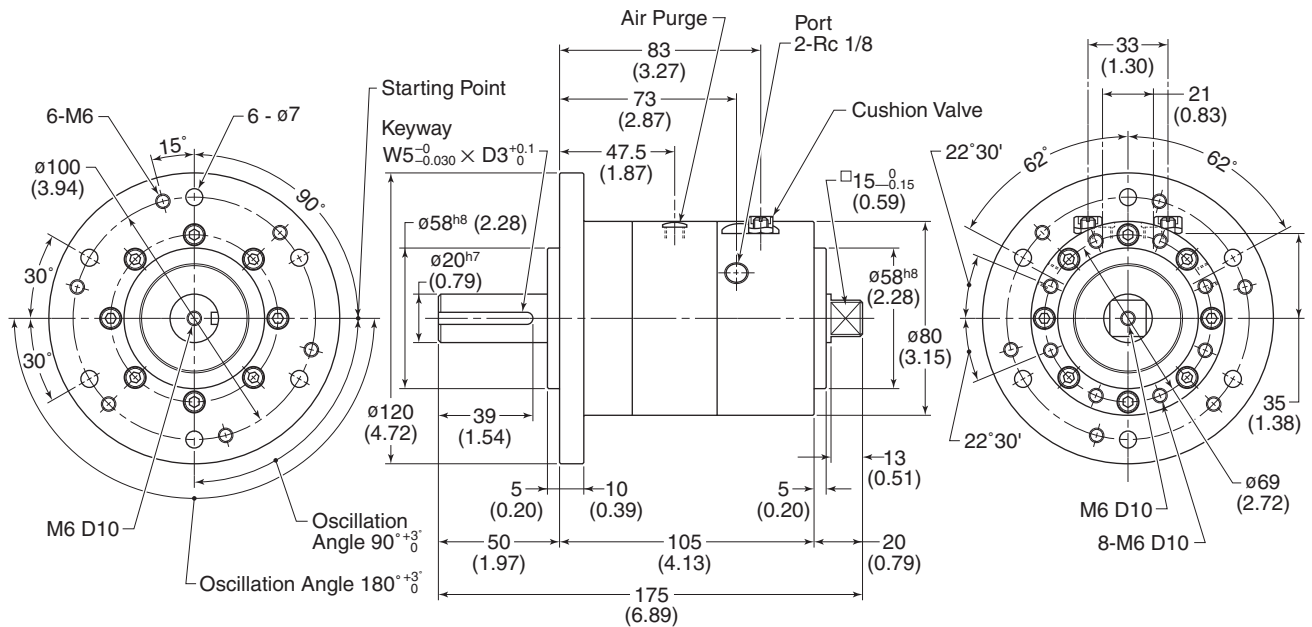
1800_HRN.pmd, M&A



HRN20S-C

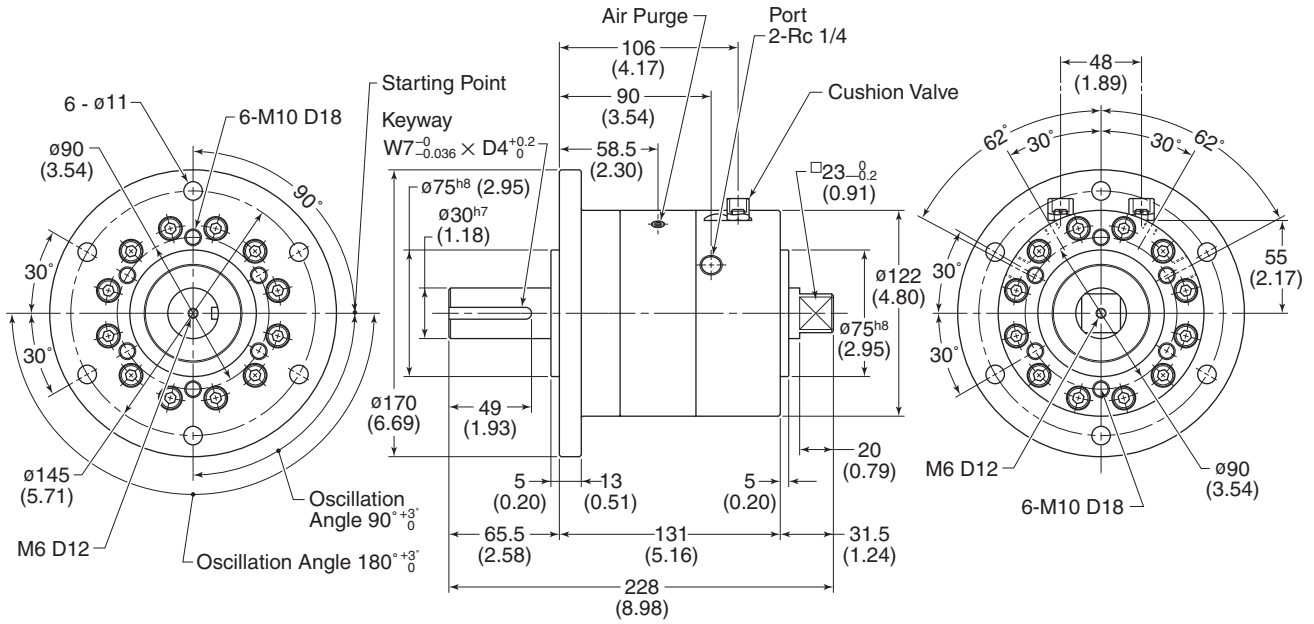


HRN30S-C

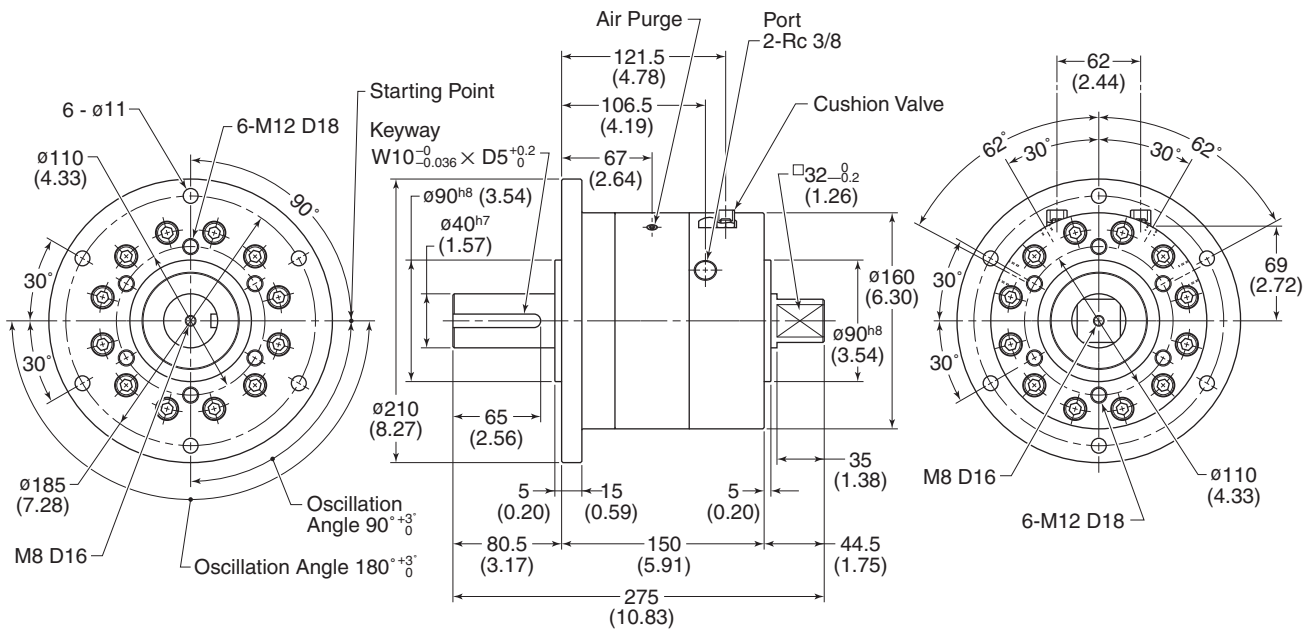


Dimensions are in mm (Inches)

HRN100S-C

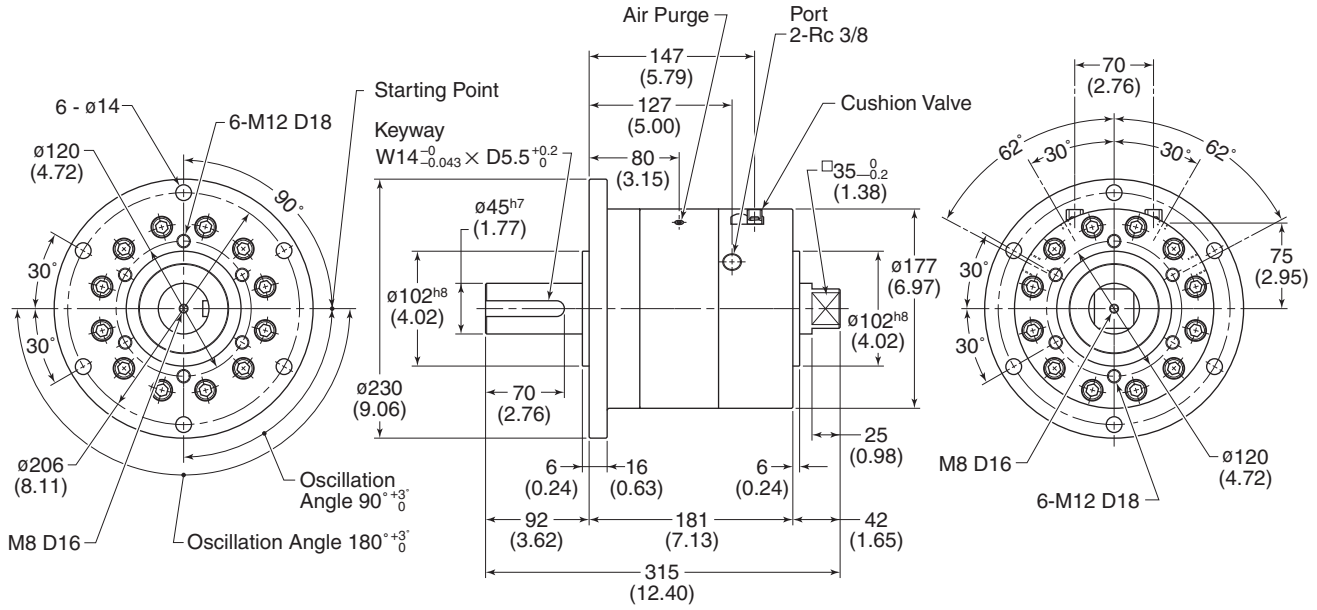


HRN200S-C

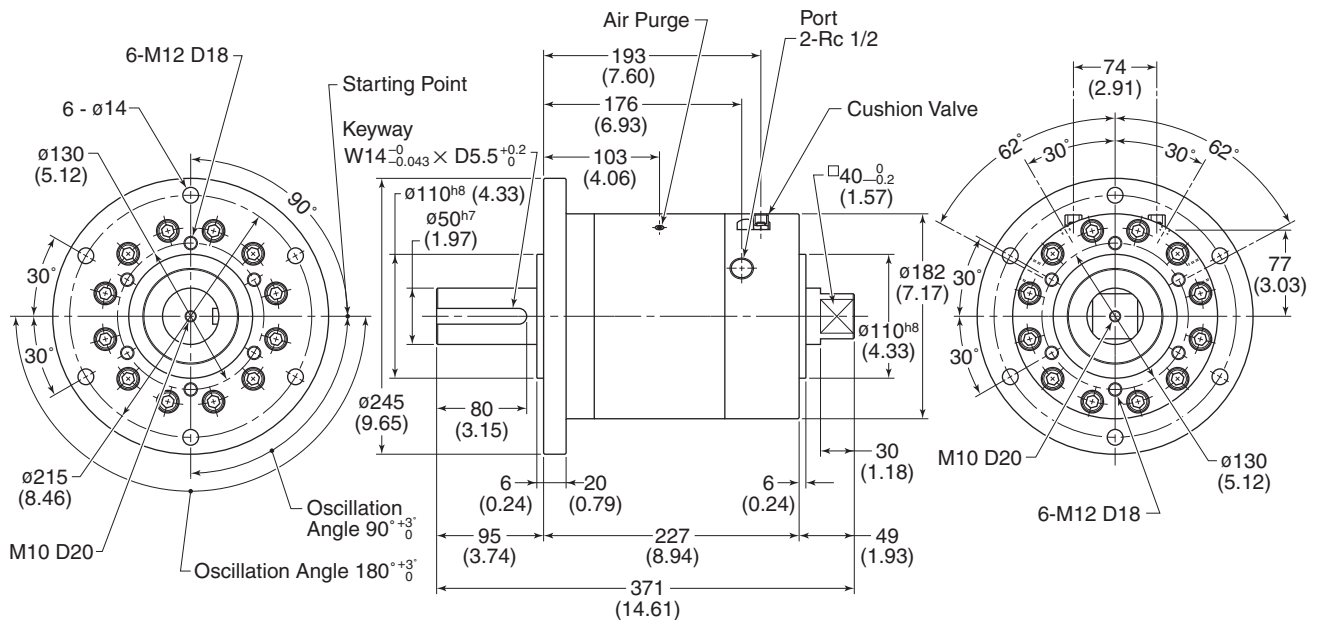


Dimensions are in mm (Inches)

HRN400S-C



HRN700S-C

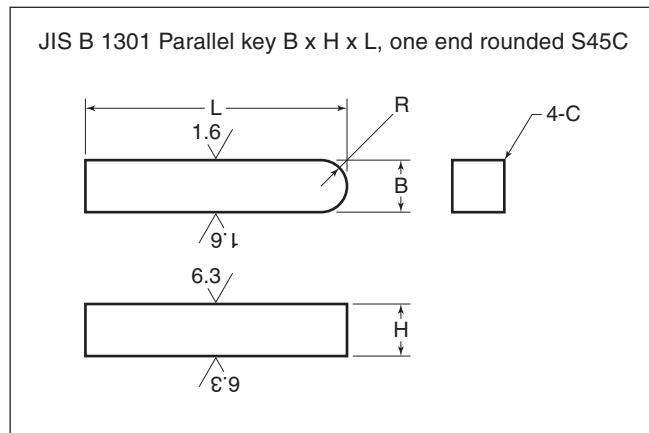


Dimensions are in mm (Inches)

Keys for HRN Series Actuators

HRN Series Actuators with keyways are accompanied by the following keys, respectively.

Model No.	Key Size	Quantity	
		Standard	With Cushion
HRN10	3 x 3 x 15	1	1
HRN15	4 x 4 x 18	1	1
HRN20	5 x 5 x 25	1	1
HRN30	5 x 5 x 39	Single Bane: 1 Double Bane: 2	1
HRN100	7 x 7 x 49	Single Bane: 1 Double Bane: 2	1
HRN200	10 x 8 x 65	Single Bane: 1 Double Bane: 2	1
HRN400	14 x 9 x 70	1	1
HRN700	14 x 9 x 80	1	1



Dimensions are in mm

Key Size	B	H	L	C	R
3 x 3 x 15	3 ⁰ _{-0.05}	3 ⁰ _{-0.25}	15 ⁰ _{-0.18}	0.16 – 0.25	1.5
4 x 4 x 18	4 ⁰ _{-0.03}	4 ⁰ _{-0.03}	18 ⁰ _{-0.18}	0.16 – 0.25	2
5 x 5 x 25	5 ⁰ _{-0.03}	5 ⁰ _{-0.03}	25 ⁰ _{-0.21}	0.25 – 0.40	2.5
5 x 5 x 39	5 ⁰ _{-0.03}	5 ⁰ _{-0.03}	39 ⁰ _{-0.25}	0.25 – 0.40	2.5
7 x 7 x 49	7 ⁰ _{-0.036}	7 ⁰ _{-0.036}	49 ⁰ _{-0.025}	0.25 – 0.40	3.5
10 x 8 x 65	10 ⁰ _{-0.036}	8 ⁰ _{-0.09}	65 ⁰ _{-0.3}	0.4 – 0.6	5
14 x 9 x 70	14 ⁰ _{-0.043}	9 ⁰ _{-0.09}	70 ⁰ _{-0.3}	0.4 – 0.6	7
14 x 9 x 80	14 ⁰ _{-0.043}	9 ⁰ _{-0.09}	80 ⁰ _{-0.3}	0.4 – 0.6	7