

CYLINDER SPECIFICATION

DOUBLE ACTING
NON CUSHIONED
2000 P.S.I. WORKING PRESSURE
3000 P.S.I. NON SHOCK
-40°C TO +80°C WORKING TEMPERATURE

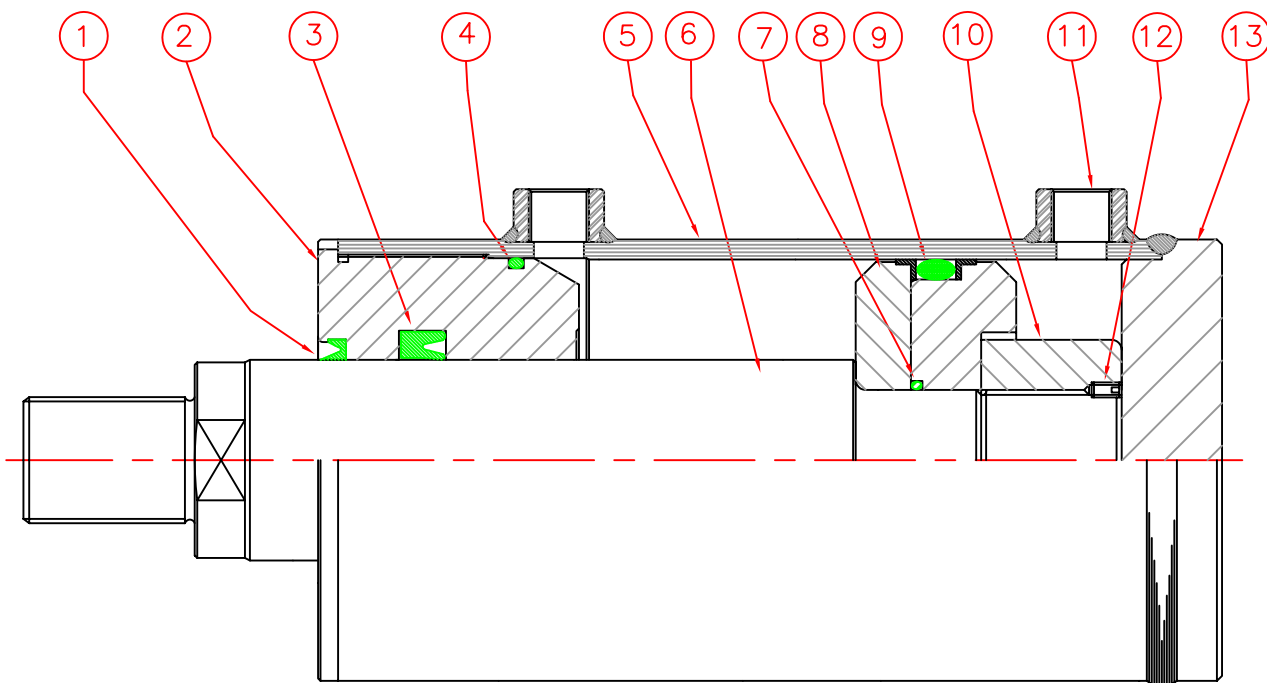
- ① PISTON ROD SCRAPER
PROLONGS CYLINDER & PISTON ROD LIFE
BY PROVIDING POSITIVE EXCLUSION OF
FOREIGN MATTER
- ② GLAND NUT
PHOS. BRONZE, SCREWED TYPE FOR EASY
ADJUSTMENT AND REPLACEMENT (WITH
LOCKING PROVISION)
- ③ GLAND
PRECISION MADE ALL STEEL FOR MAXIMUM
STRENGTH.
- ④ GLAND PACKING
EXCELLENT LOW & HIGH PRESSURE
MECHANICALLY ACTIVATED MULTI-LIP ROD SEAL.
- ⑤ GLAND SEAL
O-RING FOR POSITIVE GLAND SEALING
- ⑥ CYLINDER BARREL
MANUFACTURED FROM COLD DRAWN SEAMLESS
TUBE, HONED FOR LONG SEAL LIFE.
- ⑦ PISTON ROD
MANUFACTURED FROM HARD CHROME PLATED
ALLOY STEEL.
- ⑧ PISTON SEAL
O-RING FOR POSITIVE SEALING.
- ⑨ PISTON
2 PIECE STEEL PISTON
- ⑩ PISTON PACKING
ROBUST DESIGN WITH WEAR RINGS
FOR POSITIVE SEALING AND LONG LIFE
- ⑪ PISTON NUT
GUARANTEES POSITIVE PISTON RETENTION
- ⑫ PORTS
STANDARD B.S.P.P. PORTS
- ⑬ PISTON LOCKING SCREW
GRUB SCREW FOR POSITIVE LOCKING.
- ⑭ END CAP

GENERAL ARRANGEMENT

HYDROIL PTY. LTD 

HR SERIES
HYDRAULIC CYLINDERS

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- ① PISTON ROD SCRAPER
PROLONGS CYLINDER & PISTON ROD LIFE
BY PROVIDING POSITIVE EXCLUSION OF
FOREIGN MATTER
- ② GLAND
PRECISION MADE FROM CAST IRON.
- ③ ROD SEAL
LOW FRICTION, HIGH PERFORMANCE
GENERAL PURPOSE SEAL.
- ④ GLAND SEAL
O-RING FOR POSITIVE GLAND SEALING
- ⑤ CYLINDER BARREL
MANUFACTURED FROM COLD DRAWN SEAMLESS
TUBE, HONED FOR LONG SEAL LIFE.
- ⑥ PISTON ROD
MANUFACTURED FROM HARD CHROME PLATED
ALLOY STEEL.
- ⑦ PISTON SEAL
O-RING FOR POSITIVE SEALING.
- ⑧ PISTON
2 PIECE STEEL PISTON
- ⑨ PISTON PACKING
ROBUST DESIGN WITH WEAR RINGS
FOR POSITIVE LONG LIFE
- ⑩ PISTON NUT
GUARANTEES POSITIVE PISTON RETENTION
- ⑪ PORTS
STANDARD B.S.P.P. PORTS
- ⑫ PISTON LOCKING SCREW
GRUB SCREW FOR POSITIVE LOCKING.
- ⑬ END CAP

CYLINDER SPECIFICATION

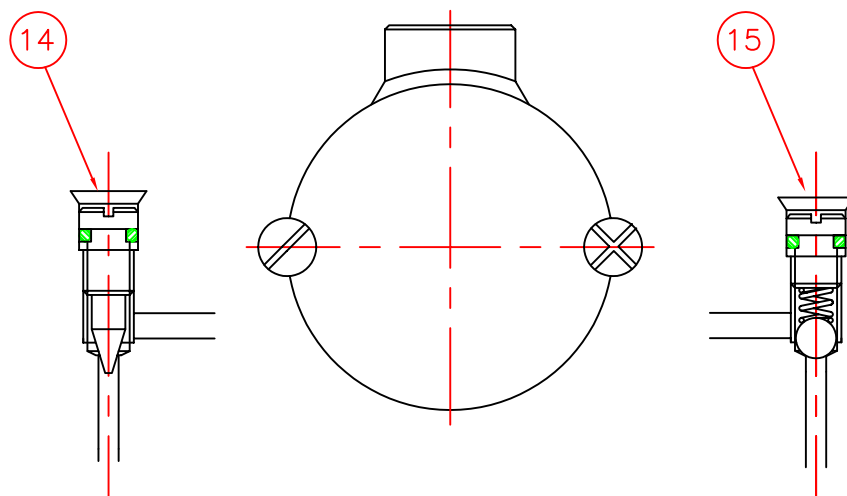
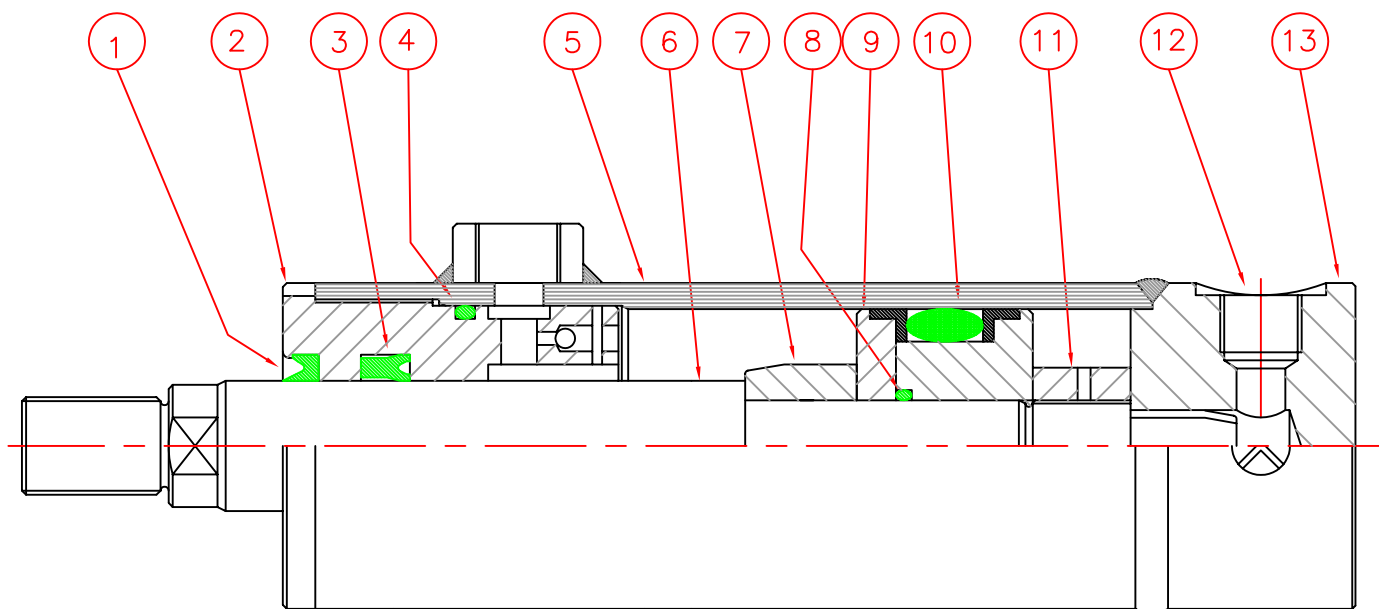
DOUBLE ACTING
NON CUSHIONED
2000 P.S.I. WORKING PRESSURE
3000 P.S.I. NON SHOCK
-40°C TO +80°C WORKING TEMPERATURE

GENERAL ARRANGEMENT



HSH SERIES
HYDRAULIC CYLINDERS

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CYLINDER SPECIFICATION
 DOUBLE ACTING
 CUSHIONED BOTH ENDS
 2000 P.S.I. WORKING PRESSURE
 3000 P.S.I. NON SHOCK
 -40°C TO +80°C WORKING TEMPERATURE

CUSHION ASSEMBLY - REAR VIEW
 REAR CUSHIONS ARE ADJUSTABLE
 FRONT CUSHIONS DO NOT ALLOW FOR ADJUSTMENT

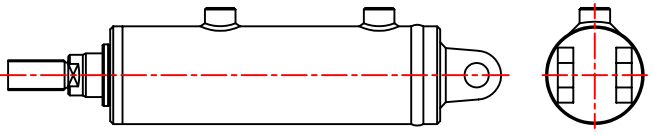
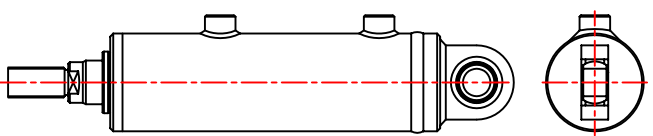
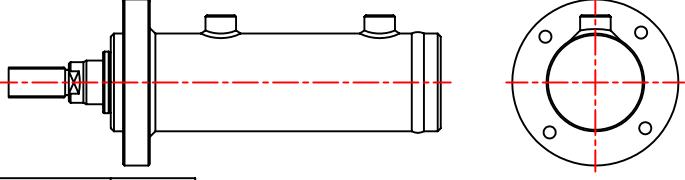
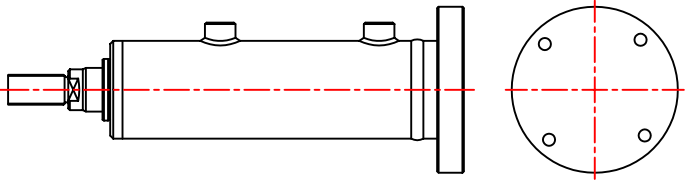
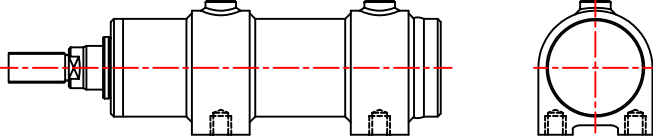
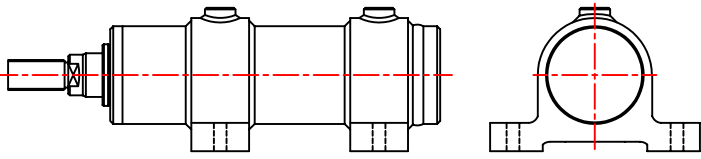
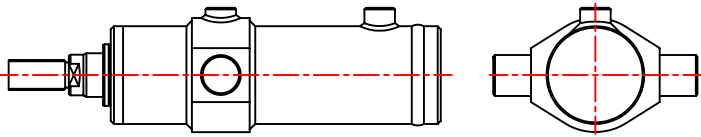
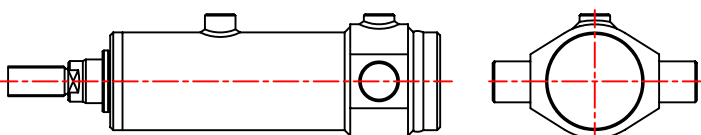
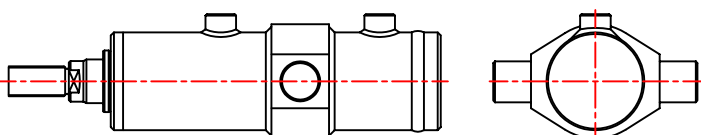
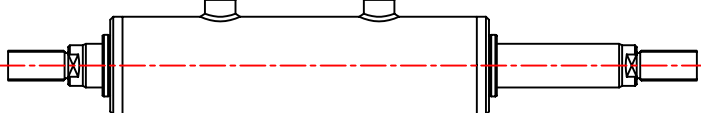
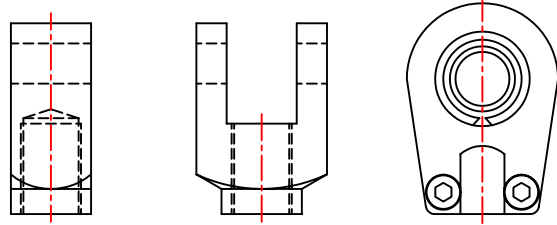
- ① PISTON ROD SCRAPER
 PROLONGS CYLINDER & PISTON ROD LIFE
 BY PROVIDING POSITIVE EXCLUSION OF
 FOREIGN MATTER
- ② GLAND
 PRECISION MADE FROM CAST IRON
 WITH INBUILT NON ADJUSTABLE CUSHION
- ③ ROD SEAL
 LOW FRICTION, HIGH PERFORMANCE
 GENERAL PURPOSE SEAL.
- ④ GLAND SEAL
 O-RING FOR POSITIVE GLAND SEALING
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 MANUFACTURED FROM COLD DRAWN SEAMLESS
 TUBE, HONED FOR LONG SEAL LIFE.
- ⑥ PISTON ROD
 MANUFACTURED FROM HARD CHROME PLATED
 ALLOY STEEL.
- ⑦ CUSHION SLEEVE
 BRONZE LOADED FOR CLOSE TOLERANCE FIT
- ⑧ PISTON SEAL
 O-RING FOR POSITIVE SEALING.
- ⑨ PISTON
 2 PIECE STEEL PISTON
- ⑩ PISTON PACKING
 ROBUST DESIGN WITH WEAR RINGS
 FOR POSITIVE SEALING AND LONG LIFE
- ⑪ PISTON NUT
 GUARANTEES POSITIVE PISTON RETENTION
- ⑫ PORTS
 STANDARD B.S.P.P. PORTS
- ⑬ END CAP
 WITH ADJUSTABLE CUSHIONS
- ⑭ CUSHION NEEDLE VALVE
 ALLOWS CUSHION ADJUSTMENT
- ⑮ CUSHION CHECK VALVE

GENERAL ARRANGEMENT

HYDROIL PTY. LTD

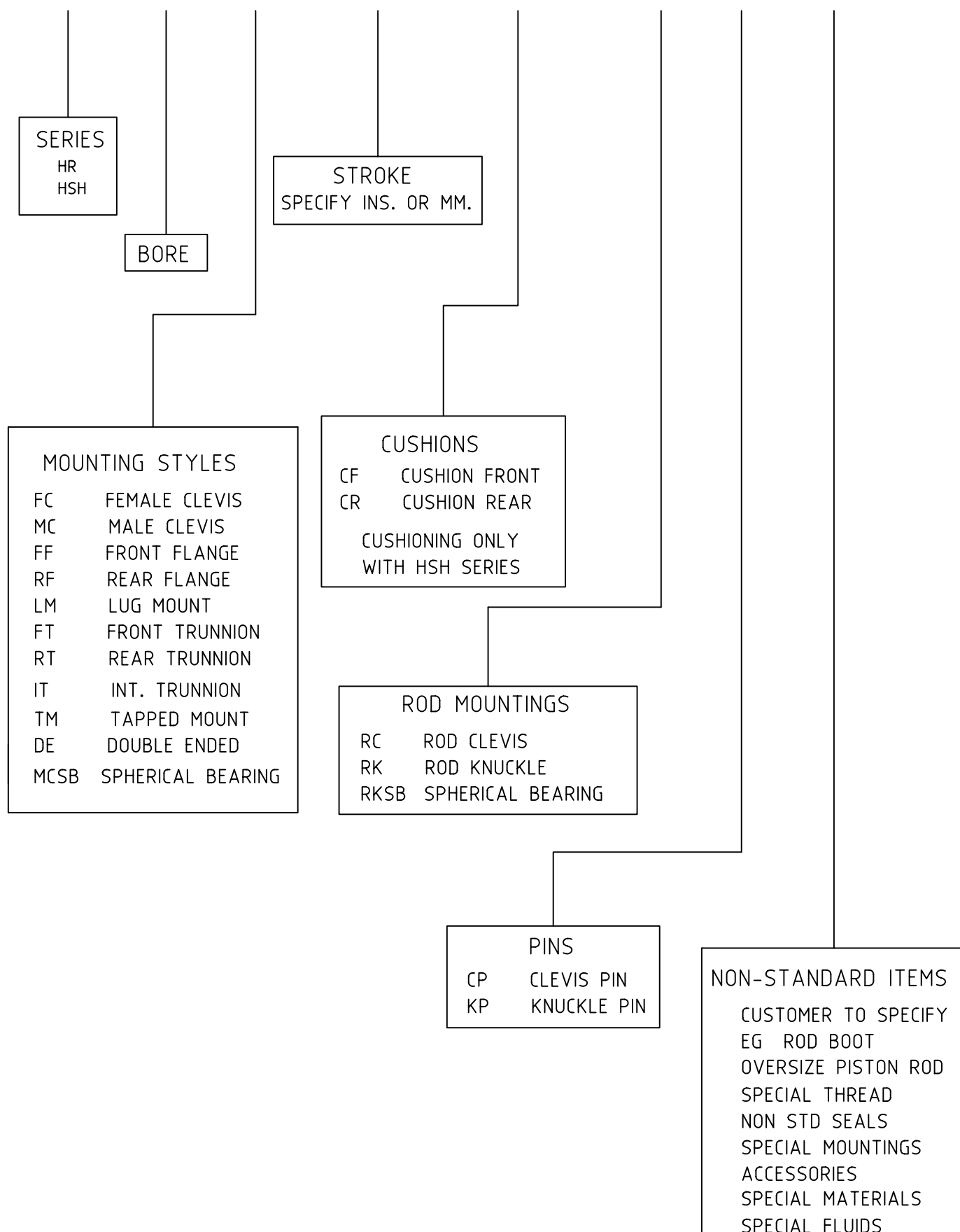
HSH CUSHIONED SERIES
 HYDRAULIC CYLINDERS

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			<div> <div>PAGE No.</div> <div>4</div> </div> <div>MOUNTING STYLE</div>		
<div> <div>STYLE</div> <div>FC</div> </div> <div>FEMALE CLEVIS</div>			<div> <div>STYLE</div> <div>MC</div> </div> <div>MALE CLEVIS</div>		
<div>PAGE No.</div> <div>6 & 7</div>			<div>PAGE No.</div> <div>8 & 9</div>		
					
<div> <div>STYLE</div> <div>MCSB</div> </div> <div>SPHERICAL BRG</div>			<div> <div>STYLE</div> <div>FF</div> </div> <div>FRONT FLANGE</div>		
<div>PAGE No.</div> <div>10 & 11</div>			<div>PAGE No.</div> <div>12 & 13</div>		
					
<div> <div>STYLE</div> <div>RF</div> </div> <div>REAR FLANGE</div>			<div> <div>STYLE</div> <div>TM</div> </div> <div>SPHERICAL BRG</div>		
<div>PAGE No.</div> <div>14 & 15</div>			<div>PAGE No.</div> <div>10 & 11</div>		
					
<div> <div>STYLE</div> <div>LM</div> </div> <div>LUG MOUNT</div>			<div> <div>STYLE</div> <div>FT</div> </div> <div>FRONT TRUNNION</div>		
<div>PAGE No.</div> <div>18 & 19</div>			<div>PAGE No.</div> <div>20 & 21</div>		
					
<div> <div>STYLE</div> <div>RT</div> </div> <div>REAR TRUNNION</div>			<div> <div>STYLE</div> <div>IT</div> </div> <div>INT TRUNNION</div>		
<div>PAGE No.</div> <div>22 & 23</div>			<div>PAGE No.</div> <div>20 & 21</div>		
					
<div> <div>STYLE</div> <div>DE</div> </div> <div>DOUBLE ENDED</div>			<div>CYLINDER ACCESSORIES</div>		
<div>PAGE No.</div> <div>24</div>			<div>PAGE No.</div> <div>25 & 26</div>		

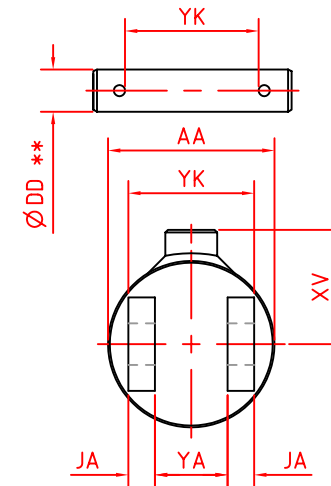
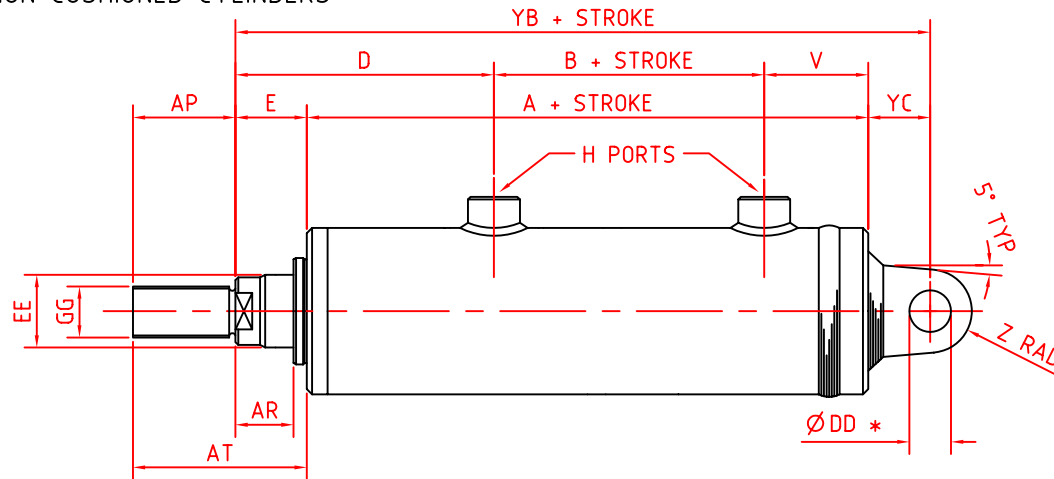
ORDERING HR & HSH SERIES HYDRAULIC CYLINDERS

HR - 25 - FC - 10.00" - CF/CR - RC - CP - S*



HR & HSH NON-CUSHIONED CYLINDERS

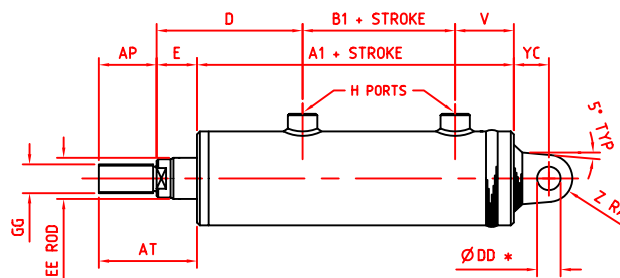
HR SHOWN



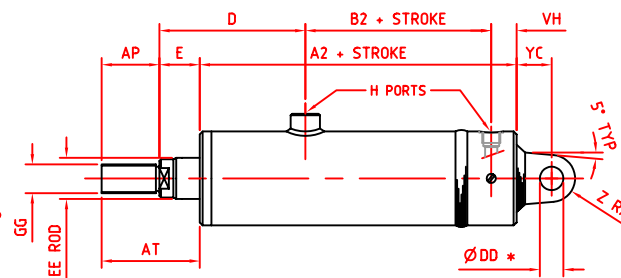
* FIT FOR HOLE DD: USE BS 1916 C H8
** FIT FOR PIN DD: USE BS 1916 C f8

CYLINDER SIZE	EE ROD	GG THREAD	A	B	E	D	AP	V	AT	H BSPP	AA	XV	AR MIN	DD	JA	YA	YB	YC	YK	Z RAD	CYLINDER SIZE
HR/HSH 15 1.50" BORE	0.875 22.22	¾" - 16UN	5.00 127.00	1.50 38.10	0.875 22.22	3.125 79.37	1.125 28.57	1.25 31.75	2.00 50.80	¾"	2.00 50.80	1.75 44.45	0.50 12.70	0.50 12.70	0.375 9.53	0.875 22.22	6.625 168.27	0.75 19.05	1.625 41.27	0.50 12.70	HR/HSH 15 1.50" BORE
HR/HSH 20 2.00" BORE	1.00 25.40	¾" - 16UN	4.875 123.82	1.875 47.62	0.875 22.22	2.75 69.85	1.125 28.57	1.125 28.57	2.00 50.80	¾"	2.50 63.50	2.00 50.80	0.50 12.70	0.625 15.88	0.50 12.70	1.00 25.40	6.625 168.27	0.875 22.22	2.00 50.80	0.625 15.88	HR/HSH 20 2.00" BORE
HR/HSH 25 2.50" BORE	1.375 34.92	1" - 14UN	5.375 136.52	2.125 53.98	1.125 28.58	3.125 79.37	1.625 41.28	1.25 31.75	2.75 69.85	½"	3.00 76.20	2.25 57.15	0.75 19.05	0.75 19.05	0.562 14.27	1.125 28.57	7.625 193.67	1.125 28.57	2.25 57.15	0.75 19.05	HR/HSH 25 2.50" BORE
HR/HSH 30 3.00" BORE	1.75 44.45	1¼" - 12UN	6.625 168.27	2.50 63.50	1.25 31.75	4.00 101.60	2.00 50.80	1.375 34.92	3.25 82.55	½"	3.50 88.90	2.375 60.33	0.875 22.22	1.00 25.40	0.625 15.88	1.375 34.93	9.25 234.95	1.375 34.93	2.625 66.68	1.00 25.40	HR/HSH 30 3.00" BORE
HR/HSH 35 3.50" BORE	1.75 44.45	1¼" - 12UN	7.00 177.80	2.50 63.50	1.25 31.75	4.00 101.60	2.00 50.80	1.75 44.45	3.25 82.55	¾"	4.00 101.60	2.875 73.03	0.875 22.22	1.00 25.40	0.625 15.88	1.375 34.93	9.625 244.48	1.375 34.93	2.625 66.68	1.00 25.40	HR/HSH 35 3.50" BORE
HR/HSH 40 4.00" BORE	2.00 50.80	1½" - 12UN	7.625 193.67	2.625 66.68	1.375 34.92	4.50 114.30	2.25 57.15	1.875 47.63	3.625 92.08	¾"	4.50 114.30	3.25 82.55	0.875 22.22	1.25 31.75	0.875 22.22	1.75 44.45	10.625 269.88	1.625 41.28	3.50 88.90	1.25 31.75	HR/HSH 40 4.00" BORE
HR/HSH 45 4.50" BORE	2.00 50.80	1½" - 12UN	8.375 212.72	3.00 76.20	1.375 34.92	4.50 114.30	2.25 57.15	2.25 57.15	3.625 92.08	¾"	5.125 130.18	3.50 88.90	0.875 22.22	1.25 31.75	0.875 22.22	1.75 44.45	11.375 289.93	1.625 41.28	3.50 88.90	1.25 31.75	HR/HSH 45 4.50" BORE
HR/HSH 50 5.00" BORE	2.50 63.50	1¾" - 12UN	8.625 219.08	3.00 76.20	1.50 38.10	4.875 123.83	3.00 76.20	2.25 57.15	4.50 114.30	1"	5.625 142.88	3.875 98.43	1.00 25.40	1.75 44.45	1.00 25.40	2.00 50.80	12.375 314.33	2.25 57.15	4.00 101.60	1.75 44.45	HR/HSH 50 5.00" BORE
HR/HSH 55 5.50" BORE	2.50 63.50	1¾" - 12UN	9.375 238.13	3.625 92.08	1.50 38.10	5.00 127.00	3.00 76.20	2.25 57.15	4.50 114.30	1"	6.125 155.58	4.25 107.95	1.00 25.40	1.75 44.45	1.00 25.40	2.00 50.80	13.125 333.38	2.25 57.15	4.00 101.60	1.75 44.45	HR/HSH 55 5.50" BORE
HR/HSH 60 6.00" BORE	3.00 76.20	2¼" - 12UN	10.00 254.00	3.875 98.43	1.50 38.10	5.125 130.18	3.50 88.90	2.50 63.50	5.00 127.00	1"	6.625 168.28	4.50 114.30	1.00 25.40	2.00 50.80	1.25 31.75	2.375 60.33	14.00 355.60	2.50 63.50	4.875 123.83	2.00 50.80	HR/HSH 60 6.00" BORE
HR/HSH 65 6.50" BORE	3.00 76.20	2¼" - 12UN	10.25 260.35	4.00 101.60	1.50 38.10	5.25 133.25	3.50 88.90	2.50 63.50	5.00 127.00	1"	7.25 184.15	4.75 120.65	1.00 25.40	2.00 50.80	1.25 31.75	2.375 60.33	14.25 361.95	2.50 63.50	4.875 123.83	2.00 50.80	HR/HSH 65 6.50" BORE
HR/HSH 70 7.00" BORE	3.50 88.90	2½" - 12UN	11.75 298.45	4.50 114.30	1.50 38.10	6.00 152.40	3.50 88.90	2.75 69.85	5.00 127.00	1¼"	7.75 196.85	5.25 133.35	1.00 25.40	2.50 63.50	1.375 34.93	2.625 66.68	16.25 412.75	3.00 76.20	5.375 136.53	2.50 63.50	HR/HSH 70 7.00" BORE
HR/HSH 75 7.50" BORE	3.50 88.90	2½" - 12UN	12.25 311.15	4.25 107.95	1.50 38.10	6.50 165.10	3.50 88.90	3.00 76.20	5.00 127.00	1¼"	8.50 215.90	5.50 139.70	1.00 25.40	2.50 63.50	1.375 34.93	2.625 66.68	16.75 425.45	3.00 76.20	5.375 136.53	2.50 63.50	HR/HSH 75 7.50" BORE
HR/HSH 80 8.00" BORE	4.00 101.60	3" - 12UN	13.25 336.55	5.00 127.00	1.50 38.10	6.50 165.10	4.00 101.60	3.25 82.55	5.50 139.70	1¼"	9.00 228.60	6.00 152.40	1.00 25.40	3.00 76.20	1.50 38.10	3.125 79.38	18.25 463.55	3.50 88.90	6.125 155.58	3.00 76.20	HR/HSH 80 8.00" BORE
HR/HSH 90 9.00" BORE	4.50 114.30	3" - 12UN	14.875 377.83	6.00 152.40	1.50 38.10	7.00 177.80	4.00 101.60	3.375 85.73	5.50 139.70	1¼"	10.00 254.00	6.50 165.10	1.00 25.40	3.50 88.90	2.00 50.80	4.00 101.60	20.375 517.53	4.00 101.60	8.00 203.20	3.50 88.90	HR/HSH 90 9.00" BORE
HR/HSH 100 10.00" BORE	5.00 127.00	3¾" - 12UN	15.625 396.88	6.125 155.58	1.50 38.10	7.50 190.50	4.375 111.13	3.50 88.90	5.875 149.22	1¼"	11.00 279.40	7.00 177.80	1.00 25.40	3.50 88.90	2.00 50.80	4.00 101.60	21.125 536.58	4.00 101.60	8.00 203.20	3.50 88.90	HR/HSH 100 10.00" BORE

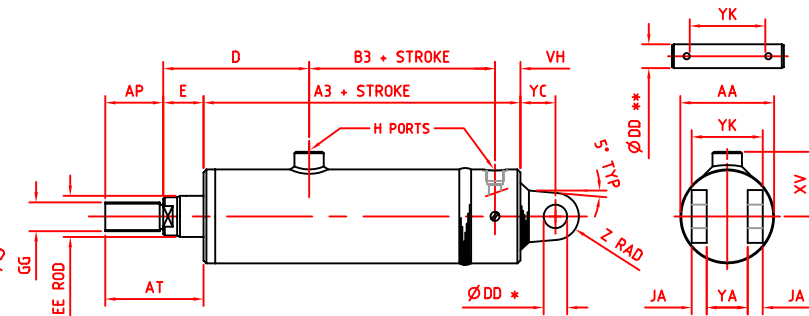
CUSHION FRONT CF



CUSHION REAR CR



CUSHION FRONT & REAR CF/CR

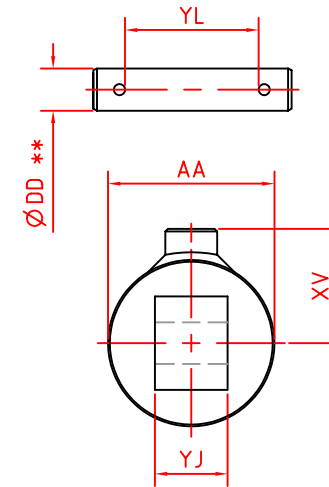
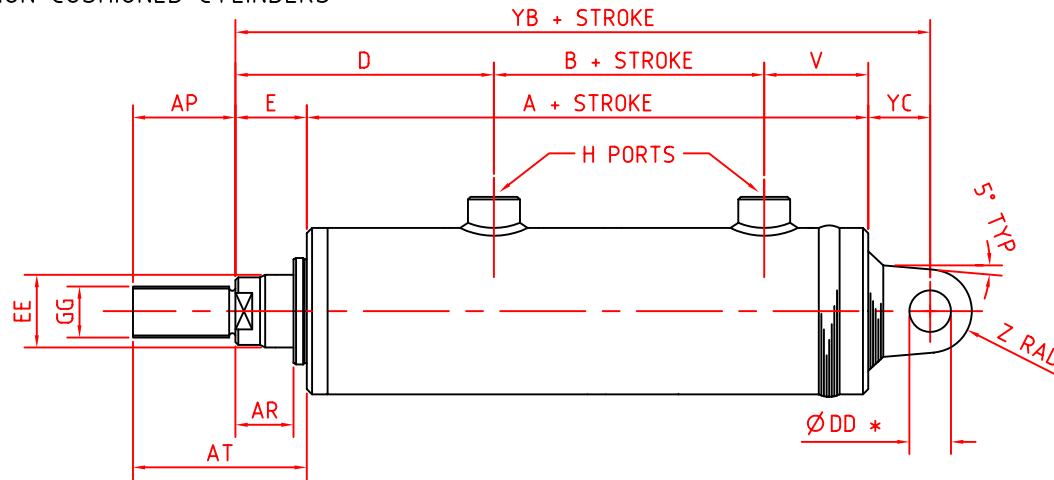


* FIT FOR HOLE DD: USE BS 1916 C HB
 ** FIT FOR PIN DD: USE BS 1916 C FB

CYLINDER SIZE	EE ROD	GG THREAD	A1	A2	A3	B1	B2	B3	E	D	AP	V	VH	AT	H BSPP	AA	XV	DD	JA	YA	YC	YK	Z RAD
HR/HS 15 1.50" BORE	0.875 22.22	3/4" - 16UN	5.875 149.23	6.375 161.93	7.25 184.15	2.375 60.33	3.375 85.73	4.25 107.95	0.875 22.22	3.125 79.37	1.125 28.57	1.25 31.75	0.75 19.05	2.00 50.80	3/8"	2.00 50.80	1.75 44.45	0.50 12.70	0.375 9.53	0.875 22.22	0.75 19.05	1.625 41.27	0.50 12.70
HR/HS 20 2.00" BORE	1.00 25.40	3/4" - 16UN	5.875 149.23	6.375 161.93	7.375 187.33	2.875 73.03	3.75 95.25	4.75 120.65	0.875 22.22	2.75 69.85	1.125 28.57	1.125 28.57	0.75 19.05	2.00 50.80	3/8"	2.50 63.50	2.00 50.80	0.625 15.88	0.50 12.70	1.00 25.40	0.875 22.22	2.00 50.80	0.625 15.88
HR/HS 25 2.50" BORE	1.375 34.92	1" - 14UN	6.375 161.93	6.875 174.63	7.875 200.03	3.125 79.38	4.00 101.60	5.00 127.00	1.125 28.58	3.125 79.37	1.625 41.28	1.25 31.75	0.875 22.22	2.75 69.85	1/2"	3.00 76.20	2.25 57.15	0.75 19.05	0.562 14.27	1.125 28.57	1.125 28.57	2.25 57.15	0.75 19.05
HR/HS 30 3.00" BORE	1.75 44.45	1 1/4" - 12UN	8.125 206.38	8.125 206.38	9.625 244.48	4.00 101.60	4.50 114.30	6.00 152.40	1.25 31.75	4.00 101.60	2.00 50.80	1.375 34.92	0.875 22.22	3.25 82.55	1/2"	3.50 88.90	2.375 60.33	1.00 25.40	0.625 15.88	1.375 34.93	1.375 34.93	2.625 66.68	1.00 25.40
HR/HS 35 3.50" BORE	1.75 44.45	1 1/4" - 12UN	8.625 219.08	8.375 212.73	10.00 254.00	4.125 104.78	4.75 120.65	6.375 161.93	1.25 31.75	4.00 101.60	2.00 50.80	1.75 44.45	0.875 22.22	3.25 82.55	3/4"	4.00 101.60	2.875 73.03	1.00 25.40	0.625 15.88	1.375 34.93	1.375 34.93	2.625 66.68	1.00 25.40
HR/HS 40 4.00" BORE	2.00 50.80	1 1/2" - 12UN	9.375 238.13	8.875 225.43	10.625 269.88	4.375 111.13	4.875 138.83	6.625 168.28	1.375 34.92	4.50 114.30	2.25 57.15	1.875 47.63	0.875 22.22	3.625 92.08	3/4"	4.50 114.30	3.25 82.55	1.25 31.75	0.875 22.22	1.75 44.45	1.625 41.28	3.50 88.90	1.25 31.75
HR/HS 45 4.50" BORE	2.00 50.80	1 1/2" - 12UN	10.125 257.18	9.625 244.48	11.375 288.93	4.75 120.65	5.625 142.88	7.375 187.33	1.375 34.92	4.50 114.30	2.25 57.15	2.25 57.15	0.875 22.22	3.625 92.08	3/4"	5.125 130.18	3.50 88.90	1.25 31.75	0.875 22.22	1.75 44.45	1.625 41.28	3.50 88.90	1.25 31.75
HR/HS 50 5.00" BORE	2.50 63.50	1 3/4" - 12UN	10.625 269.88	10.625 269.88	12.625 320.68	5.00 127.00	5.875 149.23	7.875 200.03	1.50 38.10	4.875 123.83	3.00 76.20	2.25 57.15	1.375 34.93	4.50 114.30	1"	5.625 142.88	3.875 98.43	1.75 44.45	1.00 25.40	2.00 50.80	2.25 57.15	4.00 101.60	1.75 44.45
HR/HS 55 5.50" BORE	2.50 63.50	1 3/4" - 12UN	11.25 285.75	11.375 288.93	13.25 336.55	5.50 139.70	6.50 165.10	8.375 212.73	1.50 38.10	5.00 127.00	3.00 76.20	2.25 57.15	1.375 34.93	4.50 114.30	1"	6.125 155.58	4.25 107.95	1.75 44.45	1.00 25.40	2.00 50.80	2.25 57.15	4.00 101.60	1.75 44.45
HR/HS 60 6.00" BORE	3.00 76.20	2 1/4" - 12UN	12.00 304.80	12.00 304.80	14.00 355.60	5.875 149.22	7.00 177.80	9.00 228.60	1.50 38.10	5.125 130.18	3.50 88.90	2.50 63.50	1.375 34.93	5.00 127.00	1"	6.625 168.28	4.50 114.30	2.00 50.80	1.25 31.75	2.375 60.33	2.50 63.50	4.875 123.83	2.00 50.80
HR/HS 65 6.50" BORE	3.00 76.20	2 1/4" - 12UN	12.125 307.98	12.25 311.15	14.125 358.78	5.875 149.22	7.125 180.98	9.00 228.60	1.50 38.10	5.25 133.25	3.50 88.90	2.50 63.50	1.375 34.93	5.00 127.00	1"	7.25 184.15	4.75 120.65	2.00 50.80	1.25 31.75	2.375 60.33	2.50 63.50	4.875 123.83	2.00 50.80
HR/HS 70 7.00" BORE	3.50 88.90	2 1/2" - 12UN	14.50 368.30	15.00 381.00	17.75 450.85	7.25 184.15	8.50 215.90	11.25 228.75	1.50 38.10	6.00 152.40	3.50 88.90	2.75 69.85	2.00 50.80	5.00 127.00	1 1/4"	7.75 196.85	5.25 133.35	2.50 63.50	1.375 34.93	2.625 66.68	3.00 76.20	5.375 136.53	2.50 63.50
HR/HS 75 7.50" BORE	3.50 88.90	2 1/2" - 12UN	15.00 381.00	15.50 393.70	18.25 463.55	7.00 177.80	8.50 215.90	11.25 228.75	1.50 38.10	6.50 165.10	3.50 88.90	3.00 76.20	2.00 50.80	5.00 127.00	1 1/4"	8.50 215.90	5.50 139.70	2.50 63.50	1.375 34.93	2.625 66.68	3.00 76.20	5.375 136.53	2.50 63.50
HR/HS 80 8.00" BORE	4.00 101.60	3" - 12UN	16.125 409.58	16.375 415.93	19.25 488.95	7.875 200.03	9.125 230.48	12.00 304.80	1.50 38.10	6.50 165.10	4.00 101.60	3.25 82.55	2.25 57.15	5.50 139.70	1 1/4"	9.00 228.60	6.00 152.40	3.00 76.20	1.50 38.10	3.125 79.38	3.50 88.90	6.125 155.58	3.00 76.20
HR/HS 90 9.00" BORE	4.50 114.30	3" - 12UN	17.375 441.33	17.875 454.03	20.375 517.53	8.50 215.90	10.125 257.18	12.625 320.68	1.50 38.10	7.00 177.80	4.00 101.60	3.375 85.73	2.25 57.15	5.50 139.70	1 1/4"	10.00 254.00	6.50 165.10	3.50 88.90	2.00 50.80	4.00 101.60	4.00 101.60	8.00 203.20	3.50 88.90
HR/HS 100 10.00" BORE	5.00 127.00	3 3/4" - 12UN	18.125 460.38	18.50 469.90	21.00 533.40	8.625 219.08	10.25 260.35	12.75 323.85	1.50 38.10	7.50 190.50	4.375 111.13	3.50 88.90	2.25 57.15	5.875 149.22	1 1/4"	11.00 279.40	7.00 177.80	3.50 88.90	2.00 50.80	4.00 101.60	4.00 101.60	8.00 203.20	3.50 88.90

HR & HSH NON-CUSHIONED CYLINDERS

HR SHOWN

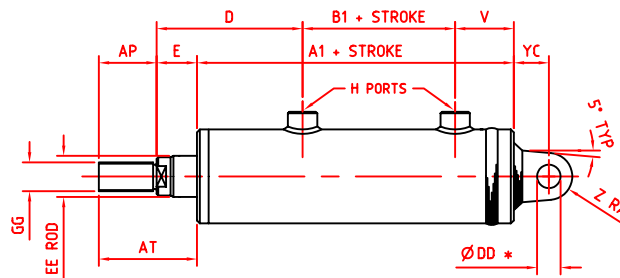


* FIT FOR HOLE DD: USE BS 1916 C H8
** FIT FOR PIN DD: USE BS 1916 C f8

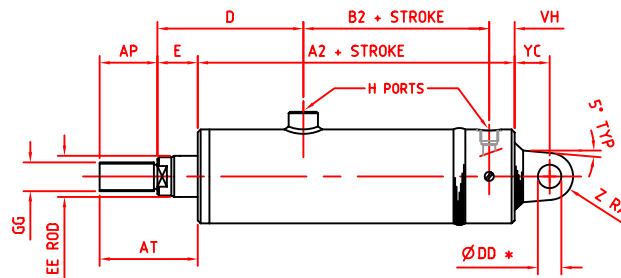
CYLINDER SIZE	EE ROD	GG THREAD	A	B	E	D	AP	V	AT	H BSPP	AA	XV	AR MIN	DD	YJ	YB	YC	YL	Z RAD	CYLINDER SIZE
HR/HSR 15 1.50" BORE	0.875 22.22	3/4" - 16UN	5.00 127.00	1.50 38.10	0.875 22.22	3.125 79.37	1.125 28.57	1.25 31.75	2.00 50.80	3/8"	2.00 50.80	1.75 44.45	0.50 12.70	0.50 12.70	1.00 25.40	6.625 168.27	0.75 19.05	1.75 44.45	0.50 12.70	HR/HSR 15 1.50" BORE
HR/HSR 20 2.00" BORE	1.00 25.40	3/4" - 16UN	4.875 123.82	1.875 47.62	0.875 22.22	2.75 69.85	1.125 28.57	1.125 28.57	2.00 50.80	3/8"	2.50 63.50	2.00 50.80	0.50 12.70	0.625 15.88	1.25 31.75	6.625 168.27	0.875 22.22	2.25 57.15	0.625 15.88	HR/HSR 20 2.00" BORE
HR/HSR 25 2.50" BORE	1.375 34.92	1" - 14UN	5.375 136.52	2.125 53.98	1.125 28.58	3.125 79.37	1.625 41.28	1.25 31.75	2.75 69.85	1/2"	3.00 76.20	2.25 57.15	0.75 19.05	0.75 19.05	1.50 38.10	7.625 193.67	1.125 28.57	2.625 66.68	0.75 19.05	HR/HSR 25 2.50" BORE
HR/HSR 30 3.00" BORE	1.75 44.45	1 1/4" - 12UN	6.625 168.27	2.50 63.50	1.25 31.75	4.00 101.60	2.00 50.80	1.375 34.92	3.25 82.55	1/2"	3.50 88.90	2.375 60.33	0.875 22.22	1.00 25.40	1.875 47.63	9.25 234.95	1.375 34.93	3.125 79.37	1.00 25.40	HR/HSR 30 3.00" BORE
HR/HSR 35 3.50" BORE	1.75 44.45	1 1/4" - 12UN	7.00 177.80	2.50 63.50	1.25 31.75	4.00 101.60	2.00 50.80	1.75 44.45	3.25 82.55	3/4"	4.00 101.60	2.875 73.03	0.875 22.22	1.00 25.40	1.875 47.63	9.625 244.48	1.375 34.93	3.125 79.37	1.00 25.40	HR/HSR 35 3.50" BORE
HR/HSR 40 4.00" BORE	2.00 50.80	1 1/2" - 12UN	7.625 193.67	2.625 66.68	1.375 34.92	4.50 114.30	2.25 57.15	1.875 47.63	3.625 92.08	3/4"	4.50 114.30	3.25 82.55	0.875 22.22	1.25 31.75	2.375 60.33	10.625 269.88	1.625 41.28	4.125 104.78	1.25 31.75	HR/HSR 40 4.00" BORE
HR/HSR 45 4.50" BORE	2.00 50.80	1 1/2" - 12UN	8.375 212.72	3.00 76.20	1.375 34.92	4.50 114.30	2.25 57.15	2.25 57.15	3.625 92.08	3/4"	5.125 130.18	3.50 88.90	0.875 22.22	1.25 31.75	2.375 60.33	11.375 289.93	1.625 41.28	4.125 104.78	1.25 31.75	HR/HSR 45 4.50" BORE
HR/HSR 50 5.00" BORE	2.50 63.50	1 3/8" - 12UN	8.625 219.08	3.00 76.20	1.50 38.10	4.875 123.83	3.00 76.20	2.25 57.15	4.50 114.30	1"	5.625 142.88	3.875 98.43	1.00 25.40	1.75 44.45	2.75 69.85	12.375 314.33	2.25 57.15	4.75 120.65	1.75 44.45	HR/HSR 50 5.00" BORE
HR/HSR 55 5.50" BORE	2.50 63.50	1 3/8" - 12UN	9.375 238.13	3.625 92.08	1.50 38.10	5.00 127.00	3.00 76.20	2.25 57.15	4.50 114.30	1"	6.125 155.58	4.25 107.95	1.00 25.40	1.75 44.45	2.75 69.85	13.125 333.38	2.25 57.15	4.75 120.65	1.75 44.45	HR/HSR 55 5.50" BORE
HR/HSR 60 6.00" BORE	3.00 76.20	2 1/4" - 12UN	10.00 254.00	3.875 98.43	1.50 38.10	5.125 130.18	3.50 88.90	2.50 63.50	5.00 127.00	1"	6.625 168.28	4.50 114.30	1.00 25.40	2.00 50.80	3.25 82.55	14.00 355.60	2.50 63.50	5.75 146.05	2.00 50.80	HR/HSR 60 6.00" BORE
HR/HSR 65 6.50" BORE	3.00 76.20	2 1/4" - 12UN	10.25 260.35	4.00 101.60	1.50 38.10	5.25 133.25	3.50 88.90	2.50 63.50	5.00 127.00	1"	7.25 184.15	4.75 120.65	1.00 25.40	2.00 50.80	3.25 82.55	14.25 361.95	2.50 63.50	5.75 146.06	2.00 50.80	HR/HSR 65 6.50" BORE
HR/HSR 70 7.00" BORE	3.50 88.90	2 1/2" - 12UN	11.75 298.45	4.50 114.30	1.50 38.10	6.00 152.40	3.50 88.90	2.75 69.85	5.00 127.00	1 1/4"	7.75 196.85	5.25 133.35	1.00 25.40	2.50 63.50	3.75 95.25	16.25 412.75	3.00 76.20	6.50 165.10	2.50 63.50	HR/HSR 70 7.00" BORE
HR/HSR 75 7.50" BORE	3.50 88.90	2 1/2" - 12UN	12.25 311.15	4.25 107.95	1.50 38.10	6.50 165.10	3.50 88.90	3.00 76.20	5.00 127.00	1 1/4"	8.50 215.90	5.50 139.70	1.00 25.40	2.50 63.50	3.75 95.25	16.75 425.45	3.00 76.20	6.50 165.10	2.50 63.50	HR/HSR 75 7.50" BORE
HR/HSR 80 8.00" BORE	4.00 101.60	3" - 12UN	13.25 336.55	5.00 127.00	1.50 38.10	6.50 165.10	4.00 101.60	3.25 82.55	5.50 139.70	1 1/4"	9.00 228.60	6.00 152.40	1.00 25.40	3.00 76.20	4.25 107.95	18.25 463.55	3.50 88.90	7.25 184.15	3.00 76.20	HR/HSR 80 8.00" BORE
HR/HSR 90 9.00" BORE	4.50 114.30	3" - 12UN	14.875 377.83	6.00 152.40	1.50 38.10	7.00 177.80	4.00 101.60	3.375 85.73	5.50 139.70	1 1/4"	10.00 254.00	6.50 165.10	1.00 25.40	3.50 88.90	4.50 114.3	20.375 517.53	4.00 101.60	8.50 215.90	3.50 88.90	HR/HSR 90 9.00" BORE
HR/HSR 100 10.00" BORE	5.00 127.00	3 3/4" - 12UN	15.625 396.88	6.125 155.58	1.50 38.10	7.50 190.50	4.375 111.13	3.50 88.90	5.875 149.22	1 1/4"	11.00 279.40	7.00 177.80	1.00 25.40	3.50 88.90	5.00 127.00	21.125 536.58	4.00 101.60	9.00 228.60	3.50 88.90	HR/HSR 100 10.00" BORE

SHS CUSHIONED CYLINDERS

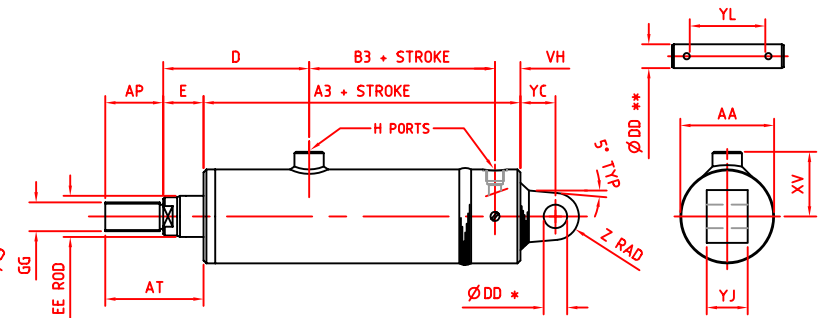
CUSHION FRONT CF



CUSHION REAR CR



CUSHION FRONT & REAR CF/CR

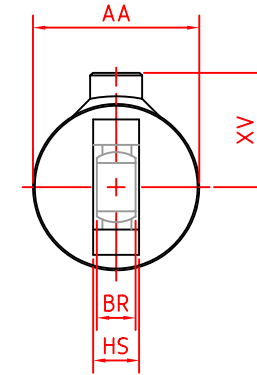
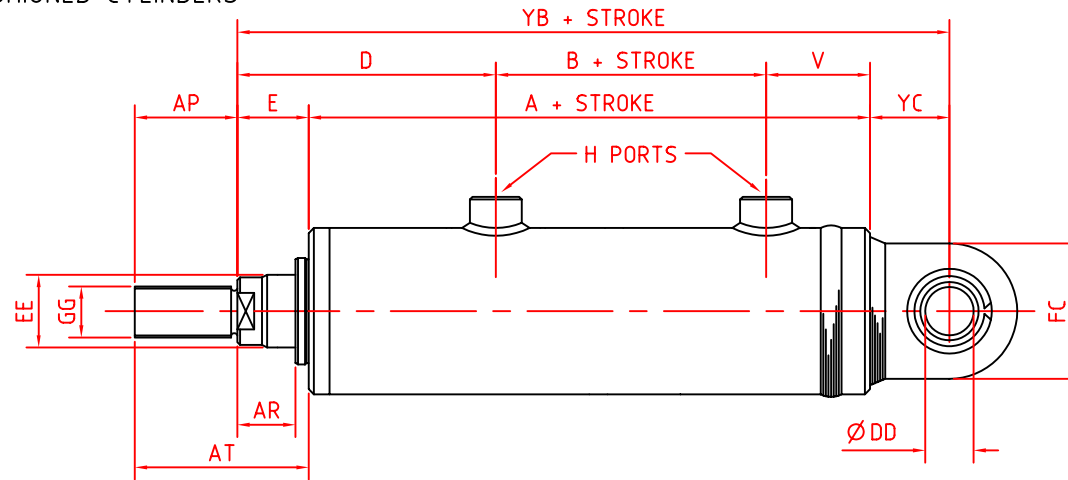


* FIT FOR HOLE DD: USE BS 1916 C H8
 ** FIT FOR PIN DD: USE BS 1916 C f8

CYLINDER SIZE	EE ROD	GG THREAD	A1	A2	A3	B1	B2	B3	E	D	AP	V	VH	AT	H BSPP	AA	XV	DD	YJ	YC	YL	Z RAD
HR/SHS 15 1.50" BORE	0.875 22.22	3/4" - 16UN	5.875 149.23	6.375 161.93	7.25 184.15	2.375 60.33	3.375 85.73	4.25 107.95	0.875 22.22	3.125 79.37	1.125 28.57	1.25 31.75	0.75 19.05	2.00 50.80	3/8"	2.00 50.80	1.75 44.45	0.50 12.70	1.00 25.40	0.75 19.05	1.75 44.45	0.50 12.70
HR/SHS 20 2.00" BORE	1.00 25.40	3/4" - 16UN	5.875 149.23	6.375 161.93	7.375 187.33	2.875 73.03	3.75 95.25	4.75 120.65	0.875 22.22	2.75 69.85	1.125 28.57	1.125 28.57	0.75 19.05	2.00 50.80	3/8"	2.50 63.50	2.00 50.80	0.625 15.88	1.25 31.75	0.875 22.22	2.25 57.15	0.625 15.88
HR/SHS 25 2.50" BORE	1.375 34.92	1" - 14UN	6.375 161.93	6.875 174.63	7.875 200.03	3.125 79.38	4.00 101.60	5.00 127.00	1.125 28.58	3.125 79.37	1.625 41.28	1.25 31.75	0.875 22.22	2.75 69.85	1/2"	3.00 76.20	2.25 57.15	0.75 19.05	1.50 38.10	1.125 28.57	2.625 66.68	0.75 19.05
HR/SHS 30 3.00" BORE	1.75 44.45	1 1/4" - 12UN	8.125 206.38	8.125 206.38	9.625 244.48	4.00 101.60	4.50 114.30	6.00 152.40	1.25 31.75	4.00 101.60	2.00 50.80	1.375 34.92	0.875 22.22	3.25 82.55	1/2"	3.50 88.90	2.375 60.33	1.00 25.40	1.875 47.63	1.375 34.93	3.125 79.37	1.00 25.40
HR/SHS 35 3.50" BORE	1.75 44.45	1 1/4" - 12UN	8.625 219.08	8.375 212.73	10.00 254.00	4.125 104.78	4.75 120.65	6.375 161.93	1.25 31.75	4.00 101.60	2.00 50.80	1.75 44.45	0.875 22.22	3.25 82.55	3/4"	4.00 101.60	2.875 73.03	1.00 25.40	1.875 47.63	1.375 34.93	3.125 79.37	1.00 25.40
HR/SHS 40 4.00" BORE	2.00 50.80	1 1/2" - 12UN	9.375 238.13	8.875 225.43	10.625 269.88	4.375 111.13	4.875 138.83	6.625 168.28	1.375 34.92	4.50 114.30	2.25 57.15	1.875 47.63	0.875 22.22	3.625 92.08	3/4"	4.50 114.30	3.25 82.55	1.25 31.75	2.375 60.33	1.625 41.28	4.125 104.78	1.25 31.75
HR/SHS 45 4.50" BORE	2.00 50.80	1 1/2" - 12UN	10.125 257.18	9.625 244.48	11.375 288.93	4.75 120.65	5.625 142.88	7.375 187.33	1.375 34.92	4.50 114.30	2.25 57.15	2.25 57.15	0.875 22.22	3.625 92.08	3/4"	5.125 130.18	3.50 88.90	1.25 31.75	2.375 60.33	1.625 41.28	4.125 104.78	1.25 31.75
HR/SHS 50 5.00" BORE	2.50 63.50	1 3/8" - 12UN	10.625 269.88	10.625 269.88	12.625 320.68	5.00 127.00	5.875 149.23	7.875 200.03	1.50 38.10	4.875 123.83	3.00 76.20	2.25 57.15	1.375 34.93	4.50 114.30	1"	5.625 142.88	3.875 98.43	1.75 44.45	2.75 69.85	2.25 57.15	4.75 120.65	1.75 44.45
HR/SHS 55 5.50" BORE	2.50 63.50	1 3/8" - 12UN	11.25 285.75	11.375 288.93	13.25 336.55	5.50 139.70	6.50 165.10	8.375 212.73	1.50 38.10	5.00 127.00	3.00 76.20	2.25 57.15	1.375 34.93	4.50 114.30	1"	6.125 155.58	4.25 107.95	1.75 44.45	2.75 69.85	2.25 57.15	4.75 120.65	1.75 44.45
HR/SHS 60 6.00" BORE	3.00 76.20	2 1/4" - 12UN	12.00 304.80	12.00 304.80	14.00 355.60	5.875 149.22	7.00 177.80	9.00 228.60	1.50 38.10	5.125 130.18	3.50 88.90	2.50 63.50	1.375 34.93	5.00 127.00	1"	6.625 168.28	4.50 114.30	2.00 50.80	3.25 82.55	2.50 63.50	5.75 146.05	2.00 50.80
HR/SHS 65 6.50" BORE	3.00 76.20	2 1/4" - 12UN	12.125 307.98	12.25 311.15	14.125 358.78	5.875 149.22	7.125 180.98	9.00 228.60	1.50 38.10	5.25 133.25	3.50 88.90	2.50 63.50	1.375 34.93	5.00 127.00	1"	7.25 184.15	4.75 120.65	2.00 50.80	3.25 82.55	2.50 63.50	5.75 146.06	2.00 50.80
HR/SHS 70 7.00" BORE	3.50 88.90	2 1/2" - 12UN	14.50 368.30	15.00 381.00	17.75 450.85	7.25 184.15	8.50 215.90	11.25 288.75	1.50 38.10	6.00 152.40	3.50 88.90	2.75 69.85	2.00 50.80	5.00 127.00	1 1/4"	7.75 196.85	5.25 133.35	2.50 63.50	3.75 95.25	3.00 76.20	6.50 165.10	2.50 63.50
HR/SHS 75 7.50" BORE	3.50 88.90	2 1/2" - 12UN	15.00 381.00	15.50 393.70	18.25 463.55	7.00 177.80	8.50 215.90	11.25 288.75	1.50 38.10	6.50 165.10	3.50 88.90	3.00 76.20	2.00 50.80	5.00 127.00	1 1/4"	8.50 215.90	5.50 139.70	2.50 63.50	3.75 95.25	3.00 76.20	6.50 165.10	2.50 63.50
HR/SHS 80 8.00" BORE	4.00 101.60	3" - 12UN	16.125 409.58	16.375 415.93	19.25 488.95	7.875 200.03	9.125 230.68	12.00 304.80	1.50 38.10	6.50 165.10	4.00 101.60	3.25 82.55	2.25 57.15	5.50 139.70	1 1/4"	9.00 228.60	6.00 152.40	3.00 76.20	4.25 107.95	3.50 88.90	7.25 184.15	3.00 76.20
HR/SHS 90 9.00" BORE	4.50 114.30	3" - 12UN	17.375 441.33	17.875 454.03	20.375 517.53	8.50 215.90	10.125 257.18	12.625 320.68	1.50 38.10	7.00 177.80	4.00 101.60	3.375 85.73	2.25 57.15	5.50 139.70	1 1/4"	10.00 254.00	6.50 165.10	3.50 88.90	4.50 114.30	4.00 101.60	8.50 215.90	3.50 88.90
HR/SHS 100 10.00" BORE	5.00 127.00	3 3/4" - 12UN	18.125 460.38	18.50 469.90	21.00 533.40	8.625 219.08	10.25 260.35	12.75 323.85	1.50 38.10	7.50 190.50	4.375 111.13	3.50 88.90	2.25 57.15	5.875 149.22	1 1/4"	11.00 279.40	7.00 177.80	3.50 88.90	5.00 127.00	4.00 101.60	9.00 228.60	3.50 88.90

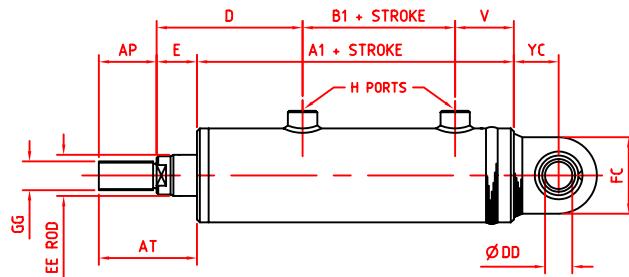
HR & HSH NON-CUSHIONED CYLINDERS

HR SHOWN

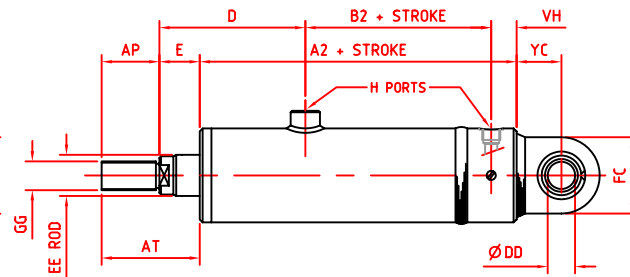


CYLINDER SIZE	EE ROD	GG THREAD	A	B	E	D	AP	V	AT	H BSPP	AA	XV	AR MIN	DD	HS	BR	YB	YC	FC	CYLINDER SIZE
HR/HS 15 1.50" BORE	0.875 22.22	3/4" - 16UN	5.00 127.00	1.50 38.10	0.875 22.22	3.125 79.37	1.125 28.57	1.25 31.75	2.00 50.80	3/8"	2.00 50.80	1.75 44.45	0.50 12.70	20mm	0.748 19.00	0.630 16.00	7.371 187.22	1.496 38.00	1.969 50.00	HR/HS 15 1.50" BORE
HR/HS 20 2.00" BORE	1.00 25.40	3/4" - 16UN	4.875 123.82	1.875 47.62	0.875 22.22	2.75 69.85	1.125 28.57	1.125 28.57	2.00 50.80	3/8"	2.50 63.50	2.00 50.80	0.50 12.70	20mm	0.748 19.00	0.630 16.00	7.246 184.05	1.496 38.00	1.969 50.00	HR/HS 20 2.00" BORE
HR/HS 25 2.50" BORE	1.375 34.92	1" - 14UN	5.375 136.52	2.125 53.98	1.125 28.58	3.125 79.37	1.625 41.28	1.25 31.75	2.75 69.85	1/2"	3.00 76.20	2.25 57.15	0.75 19.05	25mm	0.906 23.00	0.787 20.00	8.272 210.10	1.772 45.00	2.165 55.00	HR/HS 25 2.50" BORE
HR/HS 30 3.00" BORE	1.75 44.45	1 1/4" - 12UN	6.625 168.27	2.50 63.50	1.25 31.75	4.00 101.60	2.00 50.80	1.375 34.92	3.25 82.55	1/2"	3.50 88.90	2.375 60.33	0.875 22.22	30mm	1.102 28.00	0.866 22.00	9.883 251.02	2.008 51.00	2.559 65.00	HR/HS 30 3.00" BORE
HR/HS 35 3.50" BORE	1.75 44.45	1 1/4" - 12UN	7.00 177.80	2.50 63.50	1.25 31.75	4.00 101.60	2.00 50.80	1.75 44.45	3.25 82.55	3/4"	4.00 101.60	2.875 73.03	0.875 22.22	30mm	1.102 28.00	0.866 22.00	10.258 260.55	2.008 51.00	2.559 65.00	HR/HS 35 3.50" BORE
HR/HS 40 4.00" BORE	2.00 50.80	1 1/2" - 12UN	7.625 193.67	2.625 66.68	1.375 34.92	4.50 114.30	2.25 57.15	1.875 47.63	3.625 92.08	3/4"	4.50 114.30	3.25 82.55	0.875 22.22	35mm	1.181 30.00	0.984 25.00	11.402 289.61	2.402 61.00	3.268 83.00	HR/HS 40 4.00" BORE
HR/HS 45 4.50" BORE	2.00 50.80	1 1/2" - 12UN	8.375 212.72	3.00 76.20	1.375 34.92	4.50 114.30	2.25 57.15	2.25 57.15	3.625 92.08	3/4"	5.125 130.18	3.50 88.90	0.875 22.22	35mm	1.181 30.00	0.984 25.00	12.152 308.65	2.402 61.00	3.268 83.00	HR/HS 45 4.50" BORE
HR/HS 50 5.00" BORE	2.50 63.50	1 3/8" - 12UN	8.625 219.08	3.00 76.20	1.50 38.10	4.875 123.83	3.00 76.20	2.25 57.15	4.50 114.30	1"	5.625 142.88	3.875 98.43	1.00 25.40	40mm	1.378 35.00	1.102 28.00	12.842 326.18	2.717 69.00	3.937 100.00	HR/HS 50 5.00" BORE
HR/HS 55 5.50" BORE	2.50 63.50	1 3/8" - 12UN	9.375 238.13	3.625 92.08	1.50 38.10	5.00 127.00	3.00 76.20	2.25 57.15	4.50 114.30	1"	6.125 155.58	4.25 107.95	1.00 25.40	40mm	1.378 35.00	1.102 28.00	13.592 345.23	2.717 69.00	3.937 100.00	HR/HS 55 5.50" BORE
HR/HS 60 6.00" BORE	3.00 76.20	2 1/4" - 12UN	10.00 254.00	3.875 98.43	1.50 38.10	5.125 130.18	3.50 88.90	2.50 63.50	5.00 127.00	1"	6.625 168.28	4.50 114.30	1.00 25.40	50mm	1.575 40.00	1.378 35.00	14.965 380.10	3.465 88.00	4.843 123.00	HR/HS 60 6.00" BORE
HR/HS 65 6.50" BORE	3.00 76.20	2 1/4" - 12UN	10.25 260.35	4.00 101.60	1.50 38.10	5.25 133.25	3.50 88.90	2.50 63.50	5.00 127.00	1"	7.25 184.15	4.75 120.65	1.00 25.40	50mm	1.575 40.00	1.378 35.00	15.215 384.46	3.465 88.00	4.843 123.00	HR/HS 65 6.50" BORE
HR/HS 70 7.00" BORE	3.50 88.90	2 1/2" - 12UN	11.75 298.45	4.50 114.30	1.50 38.10	6.00 152.40	3.50 88.90	2.75 69.85	5.00 127.00	1 1/4"	7.75 196.85	5.25 133.35	1.00 25.40	60mm	1.969 50.00	1.732 44.00	17.187 436.55	3.937 100.00	5.512 140.00	HR/HS 70 7.00" BORE
HR/HS 75 7.50" BORE	3.50 88.90	2 1/2" - 12UN	12.25 311.15	4.25 107.95	1.50 38.10	6.50 165.10	3.50 88.90	3.00 76.20	5.00 127.00	1 1/4"	8.50 215.90	5.50 139.70	1.00 25.40	60mm	1.969 50.00	1.732 44.00	17.687 449.25	3.937 100.00	5.512 140.00	HR/HS 75 7.50" BORE
HR/HS 80 8.00" BORE	4.00 101.60	3" - 12UN	13.25 336.55	5.00 127.00	1.50 38.10	6.50 165.10	4.00 101.60	3.25 82.55	5.50 139.70	1 1/4"	9.00 228.60	6.00 152.40	1.00 25.40	80mm	2.362 60.00	2.165 55.00	20.301 515.65	5.551 141.00	7.087 180.00	HR/HS 80 8.00" BORE
HR/HS 90 9.00" BORE	4.50 114.30	3" - 12UN	14.875 377.83	6.00 152.40	1.50 38.10	7.00 177.80	4.00 101.60	3.375 85.73	5.50 139.70	1 1/4"	10.00 254.00	6.50 165.10	1.00 25.40	90mm	2.559 65.00	2.362 60.00	22.281 565.93	5.906 150.00	8.898 226.00	HR/HS 90 9.00" BORE
HR/HS 100 10.00" BORE	5.00 127.00	3 3/4" - 12UN	15.625 396.88	6.125 155.58	1.50 38.10	7.50 190.50	4.375 111.13	3.50 88.90	5.875 149.22	1 1/4"	11.00 279.40	7.00 177.80	1.00 25.40	100mm	2.756 70.00	2.756 70.00	23.818 604.98	6.693 170.00	9.843 250.00	HR/HS 100 10.00" BORE

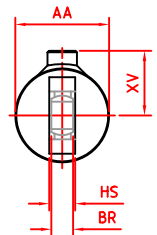
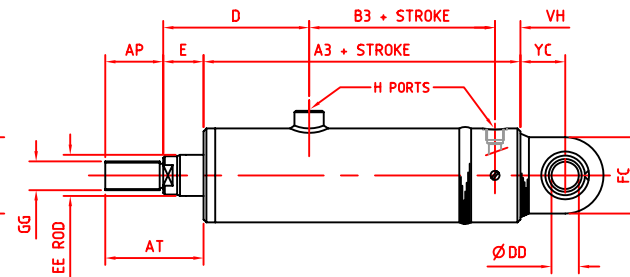
CUSHION FRONT CF



CUSHION REAR CR



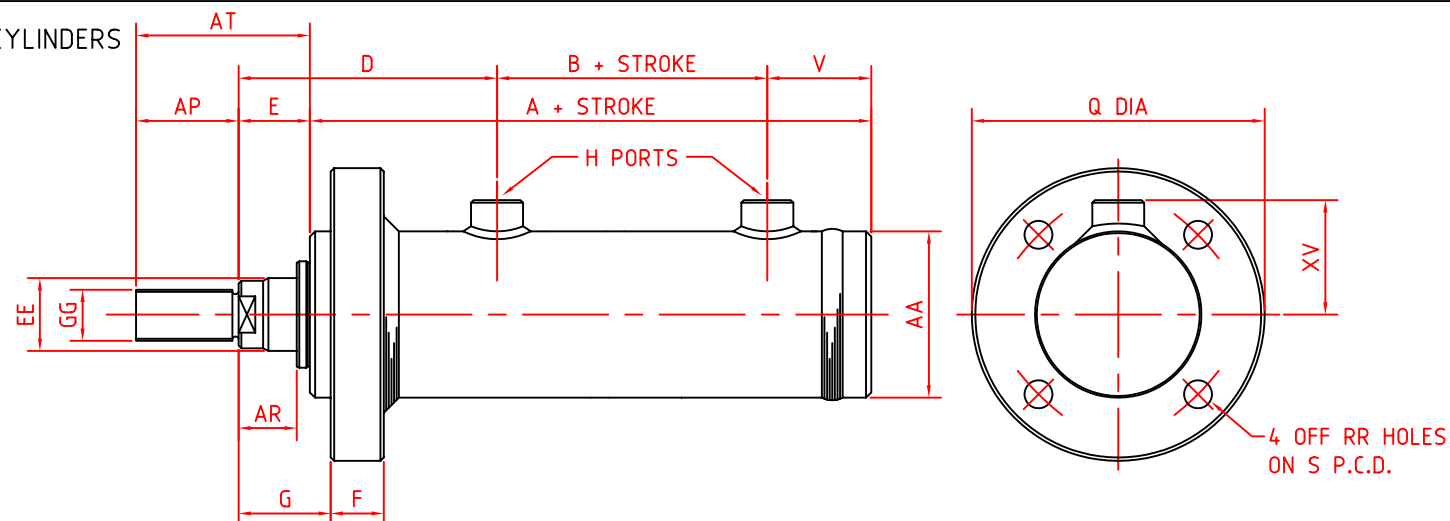
CUSHION FRONT & REAR CF/CR



CYLINDER SIZE	EE ROD	GG THREAD	A1	A2	A3	B1	B2	B3	E	D	AP	V	VH	AT	H BSPP	AA	XV	DD	HS	BR	YC	FC
HR/SHS 15 1.50" BORE	0.875 22.22	3/4" - 16UN	5.875 149.23	6.375 161.93	7.25 184.15	2.375 60.33	3.375 85.73	4.25 107.95	0.875 22.22	3.125 79.37	1.125 28.57	1.25 31.75	0.75 19.05	2.00 50.80	3/8"	2.00 50.80	1.75 44.45	20mm	0.748 19.00	0.630 16.00	1.496 38.00	1.969 50.00
HR/SHS 20 2.00" BORE	1.00 25.40	3/4" - 16UN	5.875 149.23	6.375 161.93	7.375 187.33	2.875 73.03	3.75 95.25	4.75 120.65	0.875 22.22	2.75 69.85	1.125 28.57	1.125 28.57	0.75 19.05	2.00 50.80	3/8"	2.50 63.50	2.00 50.80	20mm	0.748 19.00	0.630 16.00	1.496 38.00	1.969 50.00
HR/SHS 25 2.50" BORE	1.375 34.92	1" - 14UN	6.375 161.93	6.875 174.63	7.875 200.03	3.125 79.38	4.00 101.60	5.00 127.00	1.125 28.58	3.125 79.37	1.625 41.28	1.25 31.75	0.875 22.22	2.75 69.85	1/2"	3.00 76.20	2.25 57.15	25mm	0.906 23.00	0.787 20.00	1.772 45.00	2.165 55.00
HR/SHS 30 3.00" BORE	1.75 44.45	1 1/4" - 12UN	8.125 206.38	8.125 206.38	9.625 244.48	4.00 101.60	4.50 114.30	6.00 152.40	1.25 31.75	4.00 101.60	2.00 50.80	1.375 34.92	0.875 22.22	3.25 82.55	1/2"	3.50 88.90	2.375 60.33	30mm	1.102 28.00	0.866 22.00	2.008 51.00	2.559 65.00
HR/SHS 35 3.50" BORE	1.75 44.45	1 1/4" - 12UN	8.625 219.08	8.375 212.73	10.00 254.00	4.125 104.78	4.75 120.65	6.375 161.93	1.25 31.75	4.00 101.60	2.00 50.80	1.75 44.45	0.875 22.22	3.25 82.55	3/4"	4.00 101.60	2.875 73.03	30mm	1.102 28.00	0.866 22.00	2.008 51.00	2.559 65.00
HR/SHS 40 4.00" BORE	2.00 50.80	1 1/2" - 12UN	9.375 238.13	8.875 225.43	10.625 269.88	4.375 111.13	4.875 138.83	6.625 168.28	1.375 34.92	4.50 114.30	2.25 57.15	1.875 47.63	0.875 22.22	3.625 92.08	3/4"	4.50 114.30	3.25 82.55	35mm	1.181 30.00	0.984 25.00	2.402 61.00	3.268 83.00
HR/SHS 45 4.50" BORE	2.00 50.80	1 1/2" - 12UN	10.125 257.18	9.625 244.48	11.375 288.93	4.75 120.65	5.625 142.88	7.375 187.33	1.375 34.92	4.50 114.30	2.25 57.15	2.25 57.15	0.875 22.22	3.625 92.08	3/4"	5.125 130.18	3.50 88.90	35mm	1.181 30.00	0.984 25.00	2.402 61.00	3.268 83.00
HR/SHS 50 5.00" BORE	2.50 63.50	1 3/8" - 12UN	10.625 269.88	10.625 269.88	12.625 320.68	5.00 127.00	5.875 149.23	7.875 200.03	1.50 38.10	4.875 123.83	3.00 76.20	2.25 57.15	1.375 34.93	4.50 114.30	1"	5.625 142.88	3.875 98.43	40mm	1.378 35.00	1.102 28.00	2.717 69.00	3.937 100.00
HR/SHS 55 5.50" BORE	2.50 63.50	1 3/8" - 12UN	11.25 285.75	11.375 288.93	13.25 336.55	5.50 139.70	6.50 165.10	8.375 212.73	1.50 38.10	5.00 127.00	3.00 76.20	2.25 57.15	1.375 34.93	4.50 114.30	1"	6.125 155.58	4.25 107.95	40mm	1.378 35.00	1.102 28.00	2.717 69.00	3.937 100.00
HR/SHS 60 6.00" BORE	3.00 76.20	2 1/4" - 12UN	12.00 304.80	12.00 304.80	14.00 355.60	5.875 149.22	7.00 177.80	9.00 228.60	1.50 38.10	5.125 130.18	3.50 88.90	2.50 63.50	1.375 34.93	5.00 127.00	1"	6.625 168.28	4.50 114.30	50mm	1.575 40.00	1.378 35.00	3.465 88.00	4.843 123.00
HR/SHS 65 6.50" BORE	3.00 76.20	2 1/4" - 12UN	12.125 307.98	12.25 311.15	14.125 358.78	5.875 149.22	7.125 180.98	9.00 228.60	1.50 38.10	5.25 133.25	3.50 88.90	2.50 63.50	1.375 34.93	5.00 127.00	1"	7.25 184.15	4.75 120.65	50mm	1.575 40.00	1.378 35.00	3.465 88.00	4.843 123.00
HR/SHS 70 7.00" BORE	3.50 88.90	2 1/2" - 12UN	14.50 368.30	15.00 381.00	17.75 450.85	7.25 184.15	8.50 215.90	11.25 288.75	1.50 38.10	6.00 152.40	3.50 88.90	2.75 69.85	2.00 50.80	5.00 127.00	1 1/4"	7.75 196.85	5.25 133.35	60mm	1.969 50.00	1.732 44.00	3.937 100.00	5.512 140.00
HR/SHS 75 7.50" BORE	3.50 88.90	2 1/2" - 12UN	15.00 381.00	15.50 393.70	18.25 463.55	7.00 177.80	8.50 215.90	11.25 288.75	1.50 38.10	6.50 165.10	3.50 88.90	3.00 76.20	2.00 50.80	5.00 127.00	1 1/4"	8.50 215.90	5.50 139.70	60mm	1.969 50.00	1.732 44.00	3.937 100.00	5.512 140.00
HR/SHS 80 8.00" BORE	4.00 101.60	3" - 12UN	16.125 409.58	16.375 415.93	19.25 488.95	7.875 200.03	9.125 230.68	12.00 304.80	1.50 38.10	6.50 165.10	4.00 101.60	3.25 82.55	2.25 57.15	5.50 139.70	1 1/4"	9.00 228.60	6.00 152.40	80mm	2.362 60.00	2.165 55.00	5.551 141.00	7.087 180.00
HR/SHS 90 9.00" BORE	4.50 114.30	3" - 12UN	17.375 441.33	17.875 454.03	20.375 517.53	8.50 215.90	10.125 257.18	12.625 320.68	1.50 38.10	7.00 177.80	4.00 101.60	3.375 85.73	2.25 57.15	5.50 139.70	1 1/4"	10.00 254.00	6.50 165.10	90mm	2.559 65.00	2.362 60.00	5.906 150.00	8.898 226.00
HR/SHS 100 10.00" BORE	5.00 127.00	3 3/4" - 12UN	18.125 460.38	18.50 469.90	21.00 533.40	8.625 219.08	10.25 260.35	12.75 323.85	1.50 38.10	7.50 190.50	4.375 111.13	3.50 88.90	2.25 57.15	5.875 149.22	1 1/4"	11.00 279.40	7.00 177.80	100mm	2.756 70.00	2.756 70.00	6.693 170.00	9.843 250.00

HR & HSH NON-CUSHIONED CYLINDERS

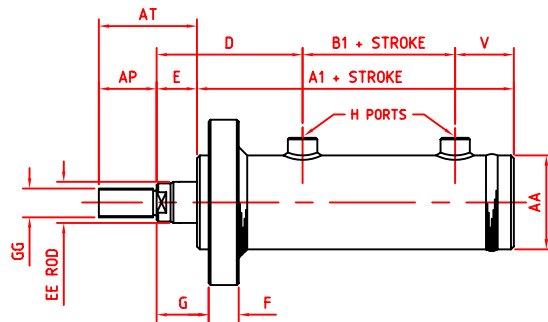
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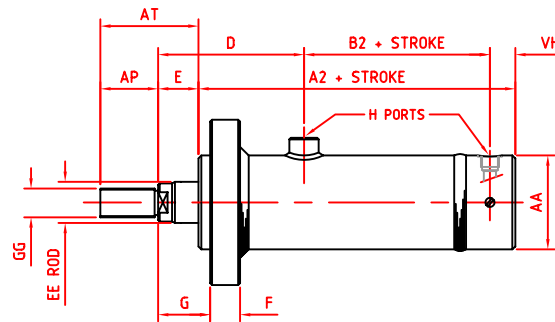
PAGE No.	12
FRONT FLANGE	
STYLE	FF

CYLINDER SIZE	EE ROD	GG THREAD	A	B	E	D	AP	V	AT	H BSPP	AA	XV	AR MIN	G	F	Q	RR	S	CYLINDER SIZE
HR/HSR 15 1.50" BORE	0.875 22.22	3/4" - 16UN	5.00 127.00	1.50 38.10	0.875 22.22	3.125 79.37	1.125 28.57	1.25 31.75	2.00 50.80	3/8"	2.00 50.80	1.75 44.45	0.50 12.70	1.125 28.57	0.375 9.52	4.00 101.60	7/16 11.11	3.25 82.55	HR/HSR 15 1.50" BORE
HR/HSR 20 2.00" BORE	1.00 25.40	3/4" - 16UN	4.875 123.82	1.875 47.62	0.875 22.22	2.75 69.85	1.125 28.57	1.125 28.57	2.00 50.80	3/8"	2.50 63.50	2.00 50.80	0.50 12.70	1.125 28.57	0.50 12.70	4.75 120.65	9/16 14.29	3.875 98.43	HR/HSR 20 2.00" BORE
HR/HSR 25 2.50" BORE	1.375 34.92	1" - 14UN	5.375 136.52	2.125 53.98	1.125 28.58	3.125 79.37	1.625 41.28	1.25 31.75	2.75 69.85	1/2"	3.00 76.20	2.25 57.15	0.75 19.05	1.375 34.92	0.50 12.70	5.375 136.53	9/16 14.29	4.50 114.30	HR/HSR 25 2.50" BORE
HR/HSR 30 3.00" BORE	1.75 44.45	1 1/4" - 12UN	6.625 168.27	2.50 63.50	1.25 31.75	4.00 101.60	2.00 50.80	1.375 34.92	3.25 82.55	1/2"	3.50 88.90	2.375 60.33	0.875 22.22	1.625 41.28	0.625 15.87	6.375 161.93	11/16 17.46	5.25 133.35	HR/HSR 30 3.00" BORE
HR/HSR 35 3.50" BORE	1.75 44.45	1 1/4" - 12UN	7.00 177.80	2.50 63.50	1.25 31.75	4.00 101.60	2.00 50.80	1.75 44.45	3.25 82.55	3/4"	4.00 101.60	2.875 73.03	0.875 22.22	1.625 41.28	0.625 15.87	6.875 174.63	11/16 17.46	5.75 146.05	HR/HSR 35 3.50" BORE
HR/HSR 40 4.00" BORE	2.00 50.80	1 1/2" - 12UN	7.625 193.67	2.625 66.68	1.375 34.92	4.50 114.30	2.25 57.15	1.875 47.63	3.625 92.08	3/4"	4.50 114.30	3.25 82.55	0.875 22.22	1.75 44.45	0.75 19.05	7.75 196.85	13/16 20.64	6.375 161.93	HR/HSR 40 4.00" BORE
HR/HSR 45 4.50" BORE	2.00 50.80	1 1/2" - 12UN	8.375 212.72	3.00 76.20	1.375 34.92	4.50 114.30	2.25 57.15	2.25 57.15	3.625 92.08	3/4"	5.125 130.18	3.50 88.90	0.875 22.22	1.75 44.45	0.75 19.05	8.625 219.08	13/16 20.64	7.25 184.15	HR/HSR 45 4.50" BORE
HR/HSR 50 5.00" BORE	2.50 63.50	1 3/8" - 12UN	8.625 219.08	3.00 76.20	1.50 38.10	4.875 123.83	3.00 76.20	2.25 57.15	4.50 114.30	1"	5.625 142.88	3.875 98.43	1.00 25.40	1.875 47.63	0.875 22.22	9.625 244.48	15/16 23.81	8.00 203.20	HR/HSR 50 5.00" BORE
HR/HSR 55 5.50" BORE	2.50 63.50	1 3/8" - 12UN	9.375 238.13	3.625 92.08	1.50 38.10	5.00 127.00	3.00 76.20	2.25 57.15	4.50 114.30	1"	6.125 155.58	4.25 107.95	1.00 25.40	2.00 50.80	1.00 25.40	10.75 273.05	1-1/16 26.99	8.875 225.43	HR/HSR 55 5.50" BORE
HR/HSR 60 6.00" BORE	3.00 76.20	2 1/4" - 12UN	10.00 254.00	3.875 98.43	1.50 38.10	5.125 130.18	3.50 88.90	2.50 63.50	5.00 127.00	1"	6.625 168.28	4.50 114.30	1.00 25.40	2.00 50.80	1.125 28.57	11.25 285.75	1-1/16 26.99	9.375 238.13	HR/HSR 60 6.00" BORE
HR/HSR 65 6.50" BORE	3.00 76.20	2 1/4" - 12UN	10.25 260.35	4.00 101.60	1.50 38.10	5.25 133.25	3.50 88.90	2.50 63.50	5.00 127.00	1"	7.25 184.15	4.75 120.65	1.00 25.40	2.00 50.80	1.25 31.75	11.875 301.62	1-1/16 26.99	10.00 254.00	HR/HSR 65 6.50" BORE
HR/HSR 70 7.00" BORE	3.50 88.90	2 1/2" - 12UN	11.75 298.45	4.50 114.30	1.50 38.10	6.00 152.40	3.50 88.90	2.75 69.85	5.00 127.00	1 1/4"	7.75 196.85	5.25 133.35	1.00 25.40	2.00 50.80	1.375 34.93	13.125 333.38	1-3/16 30.16	11.00 279.40	HR/HSR 70 7.00" BORE
HR/HSR 75 7.50" BORE	3.50 88.90	2 1/2" - 12UN	12.25 311.15	4.25 107.95	1.50 38.10	6.50 165.10	3.50 88.90	3.00 76.20	5.00 127.00	1 1/4"	8.50 215.90	5.50 139.70	1.00 25.40	2.00 50.80	1.50 38.10	13.875 352.42	1-3/16 30.16	11.75 298.45	HR/HSR 75 7.50" BORE
HR/HSR 80 8.00" BORE	4.00 101.60	3" - 12UN	13.25 336.55	5.00 127.00	1.50 38.10	6.50 165.10	4.00 101.60	3.25 82.55	5.50 139.70	1 1/4"	9.00 228.60	6.00 152.40	1.00 25.40	2.00 50.80	1.50 38.10	14.75 374.65	1-5/16 33.34	12.50 317.50	HR/HSR 80 8.00" BORE
HR/HSR 90 9.00" BORE	4.50 114.30	3" - 12UN	14.875 377.83	6.00 152.40	1.50 38.10	7.00 177.80	4.00 101.60	3.375 85.73	5.50 139.70	1 1/4"	10.00 254.00	6.50 165.10	1.00 25.40	2.00 50.80	1.75 44.45	16.50 419.10	1-9/16 39.69	13.75 349.25	HR/HSR 90 9.00" BORE
HR/HSR 100 10.00" BORE	5.00 127.00	3 3/4" - 12UN	15.625 396.88	6.125 155.58	1.50 38.10	7.50 190.50	4.375 111.13	3.50 88.90	5.875 149.22	1 1/4"	11.00 279.40	7.00 177.80	1.00 25.40	2.00 50.80	2.00 50.80	18.50 469.90	1-13/16 46.04	15.375 390.53	HR/HSR 100 10.00" BORE

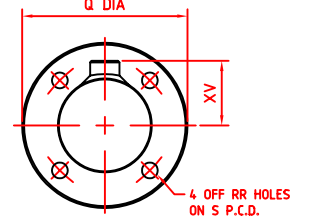
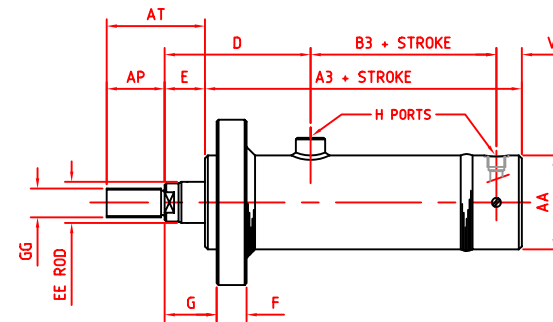
CUSHION FRONT CF



CUSHION REAR CR



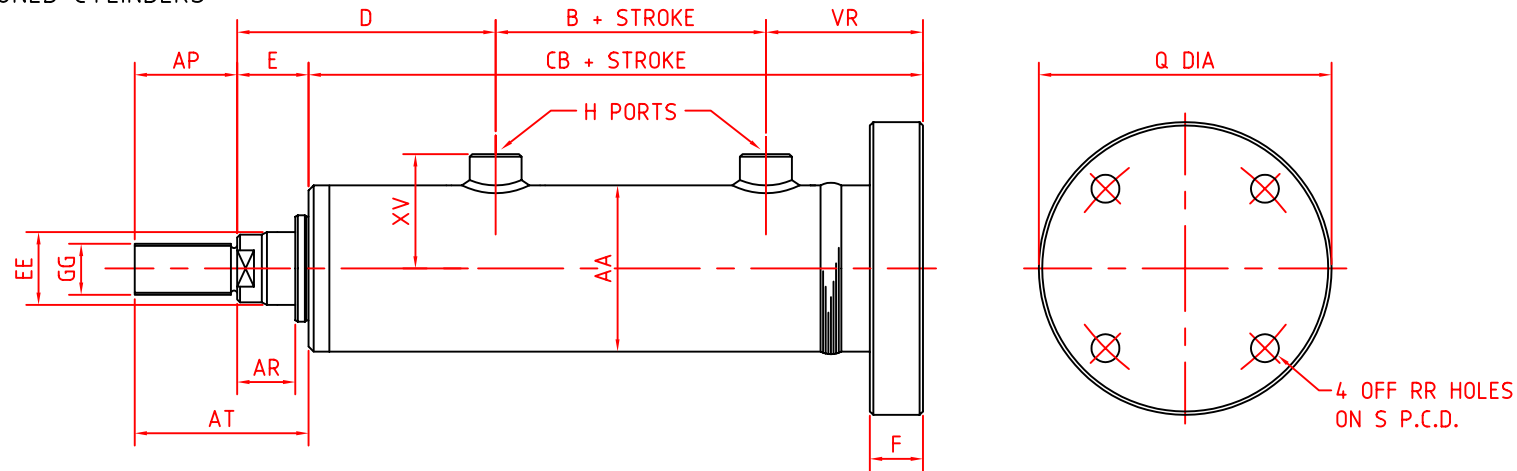
CUSHION FRONT & REAR CF/CR



CYLINDER SIZE	EE ROD	GG THREAD	A1	A2	A3	B1	B2	B3	E	D	AP	V	VH	AT	H BSPP	AA	XV	G	F	Q	RR	S
HR/SHS 15 1.50" BORE	0.875 22.22	3/4" - 16UN	5.875 149.23	6.375 161.93	7.25 184.15	2.375 60.33	3.375 85.73	4.25 107.95	0.875 22.22	3.125 79.37	1.125 28.57	1.25 31.75	0.75 19.05	2.00 50.80	3/8"	2.00 50.80	1.75 44.45	1.125 28.57	0.375 9.52	4.00 101.60	7/16 11.11	3.25 82.55
HR/SHS 20 2.00" BORE	1.00 25.40	3/4" - 16UN	5.875 149.23	6.375 161.93	7.375 187.33	2.875 73.03	3.75 95.25	4.75 120.65	0.875 22.22	2.75 69.85	1.125 28.57	1.125 28.57	0.75 19.05	2.00 50.80	3/8"	2.50 63.50	2.00 50.80	1.125 28.57	0.50 12.70	4.75 120.65	9/16 14.29	3.875 98.43
HR/SHS 25 2.50" BORE	1.375 34.92	1" - 14UN	6.375 161.93	6.875 174.63	7.875 200.03	3.125 79.38	4.00 101.60	5.00 127.00	1.125 28.58	3.125 79.37	1.625 41.28	1.25 31.75	0.875 22.22	2.75 69.85	1/2"	3.00 76.20	2.25 57.15	1.375 34.92	0.50 12.70	5.375 136.53	9/16 14.29	4.50 114.30
HR/SHS 30 3.00" BORE	1.75 44.45	1 1/4" - 12UN	8.125 206.38	8.125 206.38	9.625 244.48	4.00 101.60	4.50 114.30	6.00 152.40	1.25 31.75	4.00 101.60	2.00 50.80	1.375 34.92	0.875 22.22	3.25 82.55	1/2"	3.50 88.90	2.375 60.33	1.625 41.28	0.625 15.87	6.375 161.93	11/16 17.46	5.25 133.35
HR/SHS 35 3.50" BORE	1.75 44.45	1 1/4" - 12UN	8.625 219.08	8.375 212.73	10.00 254.00	4.125 104.78	4.75 120.65	6.375 161.93	1.25 31.75	4.00 101.60	2.00 50.80	1.75 44.45	0.875 22.22	3.25 82.55	3/4"	4.00 101.60	2.875 73.03	1.625 41.28	0.625 15.87	6.875 174.63	11/16 17.46	5.75 146.05
HR/SHS 40 4.00" BORE	2.00 50.80	1 1/2" - 12UN	9.375 238.13	8.875 225.43	10.625 269.88	4.375 111.13	4.875 138.83	6.625 168.28	1.375 34.92	4.50 114.30	2.25 57.15	1.875 47.63	0.875 22.22	3.625 92.08	3/4"	4.50 114.30	3.25 82.55	1.75 44.45	0.75 19.05	7.75 196.85	13/16 20.64	6.375 161.93
HR/SHS 45 4.50" BORE	2.00 50.80	1 1/2" - 12UN	10.125 257.18	9.625 244.48	11.375 288.93	4.75 120.65	5.625 142.88	7.375 187.33	1.375 34.92	4.50 114.30	2.25 57.15	2.25 57.15	0.875 22.22	3.625 92.08	3/4"	5.125 130.18	3.50 88.90	1.75 44.45	0.75 19.05	8.625 219.08	13/16 20.64	7.25 184.15
HR/SHS 50 5.00" BORE	2.50 63.50	1 3/8" - 12UN	10.625 269.88	10.625 269.88	12.625 320.68	5.00 127.00	5.875 149.23	7.875 200.03	1.50 38.10	4.875 123.83	3.00 76.20	2.25 57.15	1.375 34.93	4.50 114.30	1"	5.625 142.88	3.875 98.43	1.875 47.63	0.875 22.22	9.625 244.48	15/16 23.81	8.00 203.20
HR/SHS 55 5.50" BORE	2.50 63.50	1 3/8" - 12UN	11.25 285.75	11.375 288.93	13.25 336.55	5.50 139.70	6.50 165.10	8.375 212.73	1.50 38.10	5.00 127.00	3.00 76.20	2.25 57.15	1.375 34.93	4.50 114.30	1"	6.125 155.58	4.25 107.95	2.00 50.80	1.00 25.40	10.75 273.05	1-1/16 26.99	8.875 225.43
HR/SHS 60 6.00" BORE	3.00 76.20	2 1/4" - 12UN	12.00 304.80	12.00 304.80	14.00 355.60	5.875 149.22	7.00 177.80	9.00 228.60	1.50 38.10	5.125 130.18	3.50 88.90	2.50 63.50	1.375 34.93	5.00 127.00	1"	6.625 168.28	4.50 114.30	2.00 50.80	1.125 28.57	11.25 285.75	1-1/16 26.99	9.375 238.13
HR/SHS 65 6.50" BORE	3.00 76.20	2 1/4" - 12UN	12.125 307.98	12.25 311.15	14.125 358.78	5.875 149.22	7.125 180.98	9.00 228.60	1.50 38.10	5.25 133.25	3.50 88.90	2.50 63.50	1.375 34.93	5.00 127.00	1"	7.25 184.15	4.75 120.65	2.00 50.80	1.25 31.75	11.875 301.62	1-1/16 26.99	10.00 254.00
HR/SHS 70 7.00" BORE	3.50 88.90	2 1/2" - 12UN	14.50 368.30	15.00 381.00	17.75 450.85	7.25 184.15	8.50 215.90	11.25 228.75	1.50 38.10	6.00 152.40	3.50 88.90	2.75 69.85	2.00 50.80	5.00 127.00	1 1/4"	7.75 196.85	5.25 133.35	2.00 50.80	1.375 34.93	13.125 333.38	1-3/16 30.16	11.00 279.40
HR/SHS 75 7.50" BORE	3.50 88.90	2 1/2" - 12UN	15.00 381.00	15.50 393.70	18.25 463.55	7.00 177.80	8.50 215.90	11.25 228.75	1.50 38.10	6.50 165.10	3.50 88.90	3.00 76.20	2.00 50.80	5.00 127.00	1 1/4"	8.50 215.90	5.50 139.70	2.00 50.80	1.50 38.10	13.875 352.42	1-3/16 30.16	11.75 298.45
HR/SHS 80 8.00" BORE	4.00 101.60	3" - 12UN	16.125 409.58	16.375 415.93	19.25 488.95	7.875 200.03	9.125 10.125	12.00 304.80	1.50 38.10	6.50 165.10	4.00 101.60	3.25 82.55	2.25 57.15	5.50 139.70	1 1/4"	9.00 228.60	6.00 152.40	2.00 50.80	1.50 38.10	14.75 374.65	1-5/16 33.34	12.50 317.50
HR/SHS 90 9.00" BORE	4.50 114.30	3" - 12UN	17.375 441.33	17.875 454.03	20.375 517.53	8.50 215.90	10.125 257.18	12.625 320.68	1.50 38.10	7.00 177.80	4.00 101.60	3.375 85.73	2.25 57.15	5.50 139.70	1 1/4"	10.00 254.00	6.50 165.10	2.00 50.80	1.75 44.45	16.50 419.10	1-9/16 39.69	13.75 349.25
HR/SHS 100 10.00" BORE	5.00 127.00	3 3/4" - 12UN	18.125 460.38	18.50 469.90	21.00 533.40	8.625 219.08	10.25 260.35	12.75 323.85	1.50 38.10	7.50 190.50	4.375 111.13	3.50 88.90	2.25 57.15	5.875 149.22	1 1/4"	11.00 279.40	7.00 177.80	2.00 50.80	2.00 50.80	18.50 469.90	1-13/16 46.04	15.375 390.53

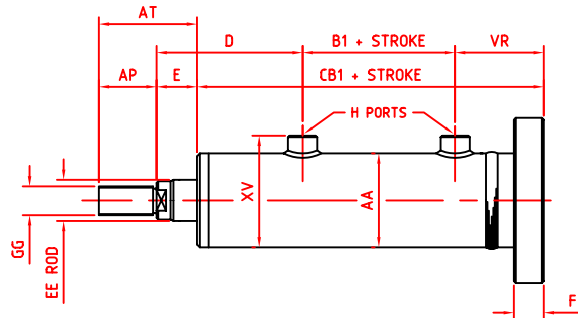
HR & HSH NON-CUSHIONED CYLINDERS

HR SHOWN

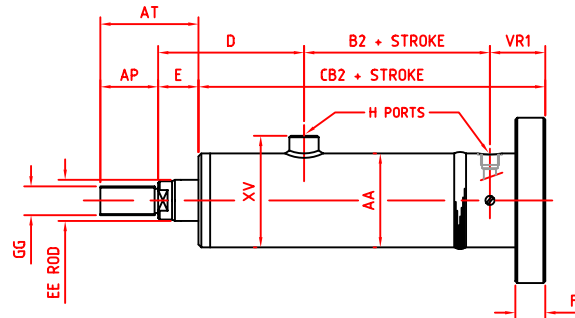


CYLINDER SIZE	EE ROD	GG THREAD	CB	B	E	D	AP	VR	AT	H BSPP	AA	XV	AR MIN	F	Q	RR	S	CYLINDER SIZE
HR/HSH 15 1.50" BORE	0.875 22.22	3/4" - 16UN	5.375 136.52	1.50 38.10	0.875 22.22	3.125 79.37	1.125 28.57	1.625 41.28	2.00 50.80	3/8"	2.00 50.80	1.75 44.45	0.50 12.70	0.375 9.52	4.00 101.60	7/16 11.11	3.25 82.55	HR/HSH 15 1.50" BORE
HR/HSH 20 2.00" BORE	1.00 25.40	3/4" - 16UN	5.375 136.52	1.875 47.62	0.875 22.22	2.75 69.85	1.125 28.57	1.625 41.28	2.00 50.80	3/8"	2.50 63.50	2.00 50.80	0.50 12.70	0.50 12.70	4.75 120.65	9/16 14.29	3.875 98.43	HR/HSH 20 2.00" BORE
HR/HSH 25 2.50" BORE	1.375 34.92	1" - 14UN	5.875 149.23	2.125 53.98	1.125 28.58	3.125 79.37	1.625 41.28	1.75 44.45	2.75 69.85	1/2"	3.00 76.20	2.25 57.15	0.75 19.05	0.50 12.70	5.375 136.53	9/16 14.29	4.50 114.30	HR/HSH 25 2.50" BORE
HR/HSH 30 3.00" BORE	1.75 44.45	1 1/4" - 12UN	7.25 184.15	2.50 63.50	1.25 31.75	4.00 101.60	2.00 50.80	2.00 50.80	3.25 82.55	1/2"	3.50 88.90	2.375 60.33	0.875 22.22	0.625 15.87	6.375 161.93	11/16 17.46	5.25 133.35	HR/HSH 30 3.00" BORE
HR/HSH 35 3.50" BORE	1.75 44.45	1 1/4" - 12UN	7.625 193.68	2.50 63.50	1.25 31.75	4.00 101.60	2.00 50.80	2.25 57.15	3.25 82.55	3/4"	4.00 101.60	2.875 73.03	0.875 22.22	0.625 15.87	6.875 174.63	11/16 17.46	5.75 146.05	HR/HSH 35 3.50" BORE
HR/HSH 40 4.00" BORE	2.00 50.80	1 1/2" - 12UN	8.00 203.20	2.625 66.68	1.375 34.92	4.50 114.30	2.25 57.15	2.25 57.15	3.625 92.08	3/4"	4.50 114.30	3.25 82.55	0.875 22.22	0.75 19.05	7.75 196.85	13/16 20.64	6.375 161.93	HR/HSH 40 4.00" BORE
HR/HSH 45 4.50" BORE	2.00 50.80	1 1/2" - 12UN	8.50 219.50	3.00 76.20	1.375 34.92	4.50 114.30	2.25 57.15	2.375 60.33	3.625 92.08	3/4"	5.125 130.18	3.50 88.90	0.875 22.22	0.75 19.05	8.625 219.08	13/16 20.64	7.25 184.15	HR/HSH 45 4.50" BORE
HR/HSH 50 5.00" BORE	2.50 63.50	1 3/8" - 12UN	9.125 231.78	3.00 76.20	1.50 38.10	4.875 123.83	3.00 76.20	2.75 69.85	4.50 114.30	1"	5.625 142.88	3.875 98.43	1.00 25.40	0.875 22.22	9.625 244.48	15/16 23.81	8.00 203.20	HR/HSH 50 5.00" BORE
HR/HSH 55 5.50" BORE	2.50 63.50	1 3/8" - 12UN	9.875 250.83	3.625 92.08	1.50 38.10	5.00 127.00	3.00 76.20	2.75 69.85	4.50 114.30	1"	6.125 155.58	4.25 107.95	1.00 25.40	1.00 25.40	10.75 273.05	1-1/16 26.99	8.875 225.43	HR/HSH 55 5.50" BORE
HR/HSH 60 6.00" BORE	3.00 76.20	2 1/4" - 12UN	10.625 269.87	3.875 98.43	1.50 38.10	5.125 130.18	3.50 88.90	3.125 79.38	5.00 127.00	1"	6.625 168.28	4.50 114.30	1.00 25.40	1.125 28.57	11.25 285.75	1-1/16 26.99	9.375 238.13	HR/HSH 60 6.00" BORE
HR/HSH 65 6.50" BORE	3.00 76.20	2 1/4" - 12UN	11.00 279.40	4.00 101.60	1.50 38.10	5.25 133.25	3.50 88.90	3.25 82.55	5.00 127.00	1"	7.25 184.15	4.75 120.65	1.00 25.40	1.25 31.75	11.875 301.62	1-1/16 26.99	10.00 254.00	HR/HSH 65 6.50" BORE
HR/HSH 70 7.00" BORE	3.50 88.90	2 1/2" - 12UN	12.50 317.50	4.50 114.30	1.50 38.10	6.00 152.40	3.50 88.90	3.50 88.90	5.00 127.00	1 1/4"	7.75 196.85	5.25 133.35	1.00 25.40	1.375 34.93	13.125 333.38	1-3/16 30.16	11.00 279.40	HR/HSH 70 7.00" BORE
HR/HSH 75 7.50" BORE	3.50 88.90	2 1/2" - 12UN	13.00 330.20	4.25 107.95	1.50 38.10	6.50 165.10	3.50 88.90	3.75 95.25	5.00 127.00	1 1/4"	8.50 215.90	5.50 139.70	1.00 25.40	1.50 38.10	13.875 352.42	1-3/16 30.16	11.75 298.45	HR/HSH 75 7.50" BORE
HR/HSH 80 8.00" BORE	4.00 101.60	3" - 12UN	13.75 349.25	5.00 127.00	1.50 38.10	6.50 165.10	4.00 101.60	3.75 95.25	5.50 139.70	1 1/4"	9.00 228.60	6.00 152.40	1.00 25.40	1.50 38.10	14.75 374.65	1-5/16 33.34	12.50 317.50	HR/HSH 80 8.00" BORE
HR/HSH 90 9.00" BORE	4.50 114.30	3" - 12UN	15.875 403.22	6.00 152.40	1.50 38.10	7.00 177.80	4.00 101.60	4.375 111.12	5.50 139.70	1 1/4"	10.00 254.00	6.50 165.10	1.00 25.40	1.75 44.45	16.50 419.10	1-9/16 39.69	13.75 349.25	HR/HSH 90 9.00" BORE
HR/HSH 100 10.00" BORE	5.00 127.00	3 3/4" - 12UN	16.625 422.28	6.125 155.58	1.50 38.10	7.50 190.50	4.375 111.13	4.50 114.30	5.875 149.22	1 1/4"	11.00 279.40	7.00 177.80	1.00 25.40	2.00 50.80	18.50 469.90	1-13/16 46.04	15.375 390.53	HR/HSH 100 10.00" BORE

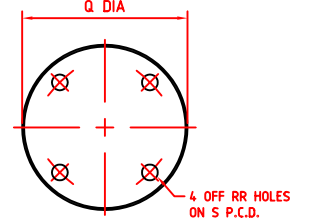
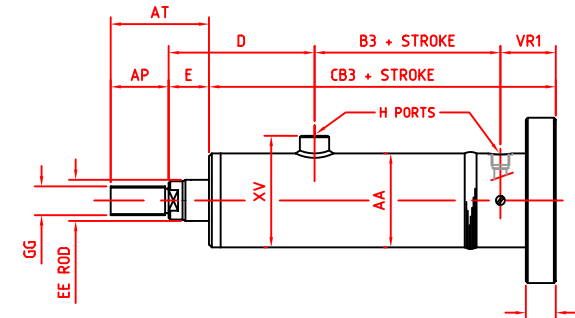
CUSHION FRONT CF



CUSHION REAR CR



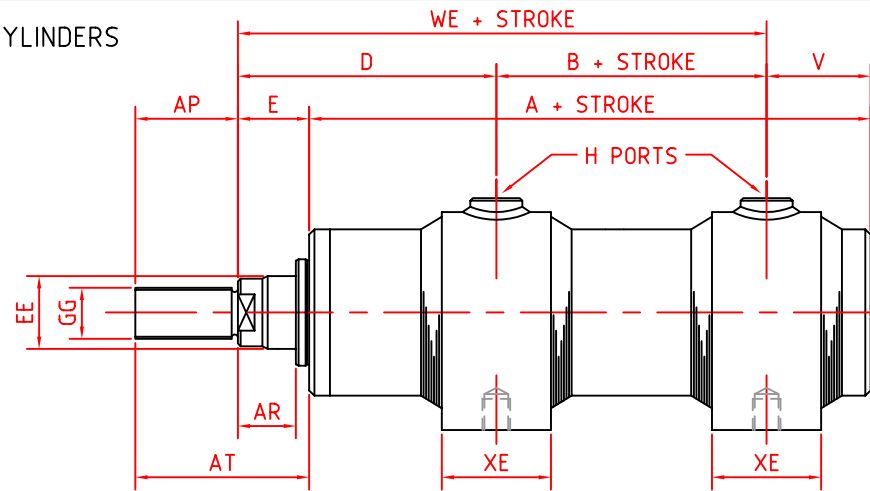
CUSHION FRONT & REAR CF/CR



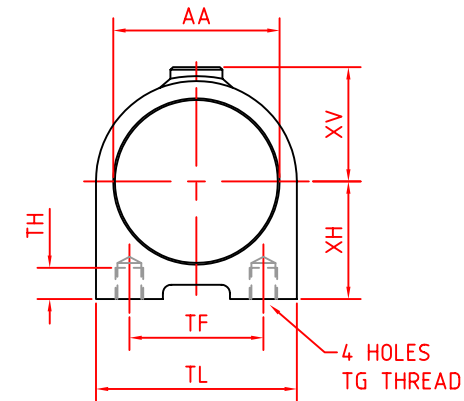
CYLINDER SIZE	EE ROD	GG THREAD	CB1	CB2	CB3	B1	B2	B3	E	D	AP	VR	VR1	AT	H BSPP	AA	XV	F	Q	RR	S
HR/HSR 15 1.50" BORE	0.875 22.22	3/4" - 16UN	6.250 158.75	6.750 191.45	7.625 193.68	2.375 60.33	3.375 85.73	4.25 107.95	0.875 22.22	3.125 79.37	1.125 28.57	1.625 41.28	2.000 50.80	2.00 50.80	3/8"	2.00 50.80	1.75 44.45	0.375 9.52	4.00 101.60	7/16 11.11	3.25 82.55
HR/HSR 20 2.00" BORE	1.00 25.40	3/4" - 16UN	6.375 161.93	6.875 174.63	7.875 200.03	2.875 73.03	3.75 95.25	4.75 120.65	0.875 22.22	2.75 69.85	1.125 28.57	1.625 41.28	2.125 50.80	2.00 50.80	3/8"	2.50 63.50	2.00 50.80	0.50 12.70	4.75 120.65	9/16 14.29	3.875 98.43
HR/HSR 25 2.50" BORE	1.375 34.92	1" - 14UN	6.875 174.63	7.375 187.33	8.375 212.73	3.125 79.38	4.00 101.60	5.00 127.00	1.125 28.58	3.125 79.37	1.625 41.28	1.75 44.45	2.250 57.15	2.75 69.85	1/2"	3.00 76.20	2.25 57.15	0.50 12.70	5.375 136.53	9/16 14.29	4.50 114.30
HR/HSR 30 3.00" BORE	1.75 44.45	1 1/4" - 12UN	8.750 222.25	8.750 222.25	10.250 260.35	4.00 101.60	4.50 114.30	6.00 152.40	1.25 31.75	4.00 101.60	2.00 50.80	2.00 50.80	2.625 66.68	3.25 82.55	1/2"	3.50 88.90	2.375 60.33	0.625 15.87	6.375 161.93	11/16 17.46	5.25 133.35
HR/HSR 35 3.50" BORE	1.75 44.45	1 1/4" - 12UN	9.250 234.95	9.000 228.60	10.625 269.88	4.125 104.78	4.75 120.65	6.375 161.93	1.25 31.75	4.00 101.60	2.00 50.80	2.25 57.15	2.875 73.03	3.25 82.55	3/4"	4.00 101.60	2.875 73.03	0.625 15.87	6.875 174.63	11/16 17.46	5.75 146.05
HR/HSR 40 4.00" BORE	2.00 50.80	1 1/2" - 12UN	9.750 247.65	9.250 234.95	11.000 279.40	4.375 111.13	4.875 138.83	6.625 168.28	1.375 34.92	4.50 114.30	2.25 57.15	2.25 57.15	2.625 66.68	3.625 92.08	3/4"	4.50 114.30	3.25 82.55	0.75 19.05	7.75 196.85	13/16 20.64	6.375 161.93
HR/HSR 45 4.50" BORE	2.00 50.80	1 1/2" - 12UN	10.250 260.35	9.750 247.85	11.500 292.10	4.75 120.65	5.625 142.88	7.375 187.33	1.375 34.92	4.50 114.30	2.25 57.15	2.375 60.33	2.500 63.50	3.625 92.08	3/4"	5.125 130.18	3.50 88.90	0.75 19.05	8.625 219.08	13/16 20.64	7.25 184.15
HR/HSR 50 5.00" BORE	2.50 63.50	1 3/8" - 12UN	11.125 282.58	11.125 282.58	13.125 333.38	5.00 127.00	5.875 149.23	7.875 200.03	1.50 38.10	4.875 123.83	3.00 76.20	2.75 69.85	3.250 82.55	4.50 114.30	1"	5.625 142.88	3.875 98.43	0.875 22.22	9.625 244.48	15/16 23.81	8.00 203.20
HR/HSR 55 5.50" BORE	2.50 63.50	1 3/8" - 12UN	11.750 298.45	11.875 301.63	13.750 349.25	5.50 139.70	6.50 165.10	8.375 212.73	1.50 38.10	5.00 127.00	3.00 76.20	2.75 69.85	3.250 82.55	4.50 114.30	1"	6.125 155.58	4.25 107.95	1.00 25.40	10.75 273.05	1-1/16 26.99	8.875 225.43
HR/HSR 60 6.000" BORE	3.00 76.20	2 1/4" - 12UN	12.625 320.68	12.625 320.68	14.625 371.48	5.875 149.22	7.00 177.80	9.00 228.60	1.50 38.10	5.125 130.18	3.50 88.90	3.125 79.38	3.750 95.25	5.00 127.00	1"	6.625 168.28	4.50 114.30	1.125 28.57	11.25 285.75	1-1/16 26.99	9.375 238.13
HR/HSR 65 6.50" BORE	3.00 76.20	2 1/4" - 12UN	12.875 327.03	13.000 330.20	14.875 377.83	5.875 149.22	7.125 180.98	9.00 228.60	1.50 38.10	5.25 133.25	3.50 88.90	3.25 82.55	4.000 101.60	5.00 127.00	1"	7.25 184.15	4.75 120.65	1.25 31.75	11.875 301.62	1-1/16 26.99	10.00 254.00
HR/HSR 70 7.00" BORE	3.50 88.90	2 1/2" - 12UN	15.250 387.35	15.750 400.05	18.500 469.90	7.25 184.15	8.50 215.90	11.25 228.75	1.50 38.10	6.00 152.40	3.50 88.90	3.50 88.90	4.250 107.95	5.00 127.00	1 1/4"	7.75 196.85	5.25 133.35	1.375 34.93	13.125 333.38	1-3/16 30.16	11.00 279.40
HR/HSR 75 7.50" BORE	3.50 88.90	2 1/2" - 12UN	15.750 400.05	16.250 412.75	19.000 482.60	7.00 177.80	8.50 215.90	11.25 228.75	1.50 38.10	6.50 165.10	3.50 88.90	3.75 95.25	4.500 114.30	5.00 127.00	1 1/4"	8.50 215.90	5.50 139.70	1.50 38.10	13.875 352.42	1-3/16 30.16	11.75 298.45
HR/HSR 80 8.000" BORE	4.00 101.60	3" - 12UN	16.625 422.28	16.875 428.63	19.750 501.65	7.875 200.03	9.125 101.25	12.00 304.80	1.50 38.10	6.50 165.10	4.00 101.60	3.75 95.25	4.250 107.95	5.50 139.70	1 1/4"	9.00 228.60	6.00 152.40	1.50 38.10	14.75 374.65	1-5/16 33.34	12.50 317.50
HR/HSR 90 9.00" BORE	4.50 114.30	3" - 12UN	18.375 466.73	18.875 479.43	21.375 542.93	8.50 215.90	10.125 257.18	12.625 320.68	1.50 38.10	7.00 177.80	4.00 101.60	4.375 111.12	5.375 136.53	5.50 139.70	1 1/4"	10.00 254.00	6.50 165.10	1.75 44.45	16.50 419.10	1-9/16 39.69	13.75 349.25
HR/HSR 100 10.00" BORE	5.00 127.00	3 3/4" - 12UN	19.125 485.78	19.500 495.30	22.000 558.80	8.625 219.08	10.25 260.35	12.75 323.85	1.50 38.10	7.50 190.50	4.375 111.13	4.50 114.30	5.500 139.70	5.875 149.22	1 1/4"	11.00 279.40	7.00 177.80	2.00 50.80	18.50 469.90	1-13/16 46.04	15.375 390.53

HR & HSH NON-CUSHIONED CYLINDERS

HR SHOWN



HIGH TENSILE BOLTS OR THRUST KEYS ARE
REQUIRED WHEN MOUNTING TAPPED MOUNTED CYLINDERS



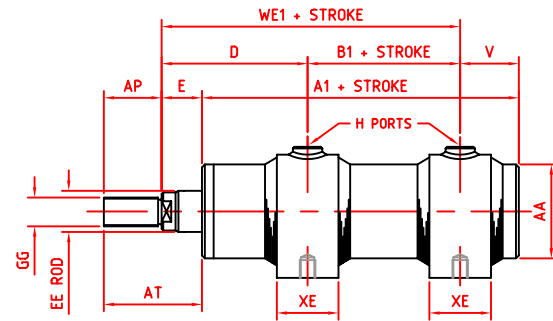
CYLINDER SIZE	EE ROD	GG THREAD	A	B	E	D	AP	V	AT	H BSPP	AA	XV	AR MIN	TF	TG UNC THREAD	TH	TL	XE	XH	WE	CYLINDER SIZE
HR/HSH 15 1.50" BORE	0.875 22.22	3/4" - 16UN	5.00 127.00	1.50 38.10	0.875 22.22	3.125 79.37	1.125 28.57	1.25 31.75	2.00 50.80	3/8"	2.00 50.80	1.75 44.45	0.50 12.70	1.50 38.10	1/2" - 13	0.50 12.70	2.50 63.50	1.375 34.93	1.50 38.10	4.625 117.48	HR/HSH 15 1.50" BORE
HR/HSH 20 2.00" BORE	1.00 25.40	3/4" - 16UN	4.875 123.82	1.875 47.62	0.875 22.22	2.75 69.85	1.125 28.57	1.25 28.57	2.00 50.80	3/8"	2.50 63.50	2.00 50.80	0.50 12.70	2.00 50.80	1/2" - 13	0.562 14.27	3.00 76.20	1.375 34.93	1.75 44.45	4.625 117.48	HR/HSH 20 2.00" BORE
HR/HSH 25 2.50" BORE	1.375 34.92	1" - 14UN	5.375 136.52	2.125 53.98	1.125 28.58	3.125 79.37	1.625 41.28	1.25 31.75	2.75 69.85	1/2"	3.00 76.20	2.25 57.15	0.75 19.05	2.25 57.15	5/8" - 11	0.688 17.46	3.50 88.90	1.50 38.10	2.25 57.15	5.25 133.35	HR/HSH 25 2.50" BORE
HR/HSH 30 3.00" BORE	1.75 44.45	1 1/4" - 12UN	6.625 168.27	2.50 63.50	1.25 31.75	4.00 101.60	2.00 50.80	1.375 34.92	3.25 82.55	1/2"	3.50 88.90	2.375 60.33	0.875 22.22	2.50 63.50	3/4" - 10	0.813 20.64	4.00 101.60	1.625 41.28	2.50 63.50	6.50 165.10	HR/HSH 30 3.00" BORE
HR/HSH 35 3.50" BORE	1.75 44.45	1 1/4" - 12UN	7.00 177.80	2.50 63.50	1.25 31.75	4.00 101.60	2.00 50.80	1.75 44.45	3.25 82.55	3/4"	4.00 101.60	2.875 73.03	0.875 22.22	3.25 82.55	3/4" - 10	0.875 22.22	4.75 120.65	2.00 50.80	2.875 73.03	6.50 165.10	HR/HSH 35 3.50" BORE
HR/HSH 40 4.00" BORE	2.00 50.80	1 1/2" - 12UN	7.625 193.67	2.625 66.68	1.375 34.92	4.50 114.30	2.25 57.15	1.875 47.63	3.625 92.08	3/4"	4.50 114.30	3.25 82.55	0.875 22.22	3.25 82.55	1" - 8	1.063 26.99	5.25 133.35	2.00 50.80	3.25 82.55	7.125 180.98	HR/HSH 40 4.00" BORE
HR/HSH 45 4.50" BORE	2.00 50.80	1 1/2" - 12UN	8.375 212.72	3.00 76.20	1.375 34.92	4.50 114.30	2.25 57.15	2.25 57.15	3.625 92.08	3/4"	5.125 130.18	3.50 88.90	0.875 22.22	3.875 98.43	1" - 8	1.063 26.99	5.875 149.23	2.25 57.15	3.50 88.90	7.50 190.50	HR/HSH 45 4.50" BORE
HR/HSH 50 5.00" BORE	2.50 63.50	1 3/8" - 12UN	8.625 219.08	3.00 76.20	1.50 38.10	4.875 123.83	3.00 76.20	2.25 57.15	4.50 114.30	1"	5.625 142.88	3.875 98.43	1.00 25.40	3.875 98.43	1-1/8" - 7	1.313 33.34	6.375 161.93	2.50 63.50	4.00 101.60	7.875 200.03	HR/HSH 50 5.00" BORE
HR/HSH 55 5.50" BORE	2.50 63.50	1 3/8" - 12UN	9.375 238.13	3.625 92.08	1.50 38.10	5.00 127.00	3.00 76.20	2.25 57.15	4.50 114.30	1"	6.125 155.58	4.25 107.95	1.00 25.40	4.375 111.13	1-1/8" - 7	1.313 33.34	6.875 174.35	2.50 63.50	4.25 107.95	8.625 219.08	HR/HSH 55 5.50" BORE
HR/HSH 60 6.00" BORE	3.00 76.20	2 1/4" - 12UN	10.00 254.00	3.875 98.43	1.50 38.10	5.125 130.18	3.50 88.90	2.50 63.50	5.00 127.00	1"	6.625 168.28	4.50 114.30	1.00 25.40	5.125 130.18	1-1/8" - 7	1.375 34.93	7.625 193.68	2.50 63.50	4.50 114.30	9.00 228.60	HR/HSH 60 6.00" BORE
HR/HSH 65 6.50" BORE	3.00 76.20	2 1/4" - 12UN	10.25 260.35	4.00 101.60	1.50 38.10	5.25 133.25	3.50 88.90	2.50 63.50	5.00 127.00	1"	7.25 184.15	4.75 120.65	1.00 25.40	5.50 139.70	1-3/8" - 6	1.50 38.10	8.25 209.55	2.75 69.85	4.75 120.65	9.25 234.95	HR/HSH 65 6.50" BORE
HR/HSH 70 7.00" BORE	3.50 88.90	2 1/2" - 12UN	11.75 298.45	4.50 114.30	1.50 38.10	6.00 152.40	3.50 88.90	2.75 69.85	5.00 127.00	1 1/4"	7.75 196.85	5.25 133.35	1.00 25.40	6.00 152.40	1-1/2" - 6	1.625 41.28	9.00 228.60	3.00 76.20	5.00 127.00	10.50 266.70	HR/HSH 70 7.00" BORE
HR/HSH 75 7.50" BORE	3.50 88.90	2 1/2" - 12UN	12.25 311.15	4.25 107.95	1.50 38.10	6.50 165.10	3.50 88.90	3.00 76.20	5.00 127.00	1 1/4"	8.50 215.90	5.50 139.70	1.00 25.40	6.75 171.45	1-1/2" - 6	1.625 41.28	9.75 247.65	3.00 76.20	5.25 133.35	10.75 273.05	HR/HSH 75 7.50" BORE
HR/HSH 80 8.00" BORE	4.00 101.60	3" - 12UN	13.25 336.55	5.00 127.00	1.50 38.10	6.50 165.10	4.00 101.60	3.25 82.55	5.50 139.70	1 1/4"	9.00 228.60	6.00 152.40	1.00 25.40	7.50 190.50	1-1/2" - 6	1.625 41.28	10.50 266.70	3.50 88.90	5.50 139.70	11.50 292.10	HR/HSH 80 8.00" BORE
HR/HSH 90 9.00" BORE	4.50 114.30	3" - 12UN	14.875 377.83	6.00 152.40	1.50 38.10	7.00 177.80	4.00 101.60	3.375 85.73	5.50 139.70	1 1/4"	10.00 254.00	6.50 165.10	1.00 25.40	8.00 203.20	1-3/4" - 5	2.00 50.80	11.50 292.10	4.25 107.95	6.50 165.10	13.00 330.20	HR/HSH 90 9.00" BORE
HR/HSH 100 10.00" BORE	5.00 127.00	3 3/4" - 12UN	15.625 396.88	6.125 155.58	1.50 38.10	7.50 190.50	4.375 111.13	3.50 88.90	5.875 149.22	1 1/4"	11.00 279.40	7.00 177.80	1.00 25.40	9.00 228.60	1-3/4" - 5	2.00 50.80	12.50 317.50	4.625 117.48	6.75 171.45	13.625 346.08	HR/HSH 100 10.00" BORE

HSH CUSHIONED CYLINDERS

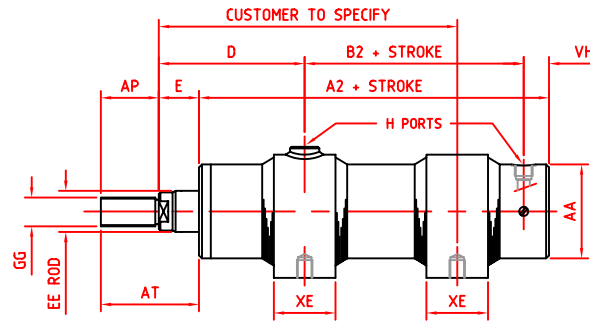
HIGH TENSILE BOLTS OT THRUST KEYS ARE REQUIRED
WHEN MOUNTING TAPPED MOUNTED CYLINDERS

PAGE No.	17
TAPPED MOUNT	
STYLE	TM

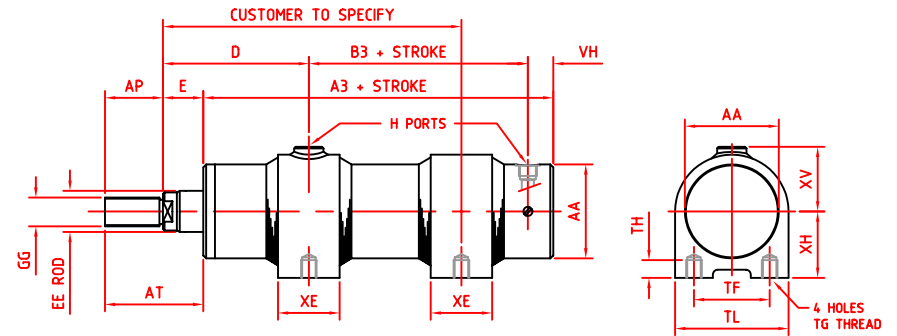
CUSHION FRONT CF



CUSHION REAR CR



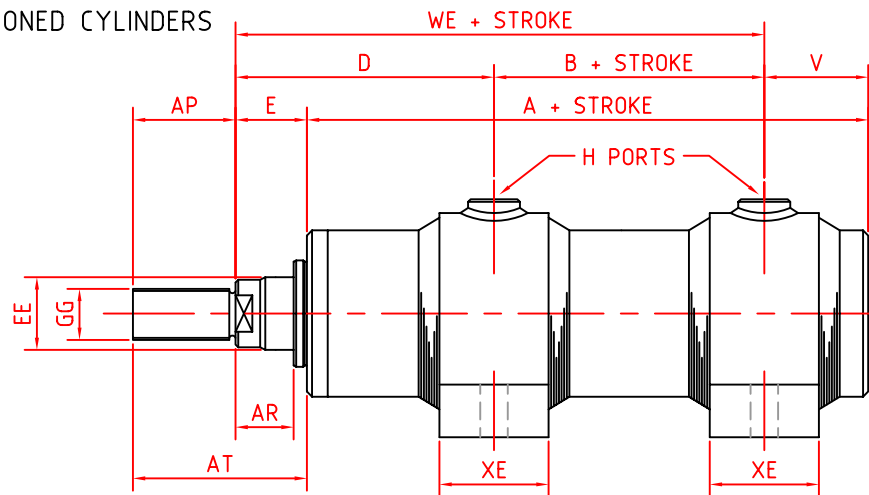
CUSHION FRONT & REAR CF/CR



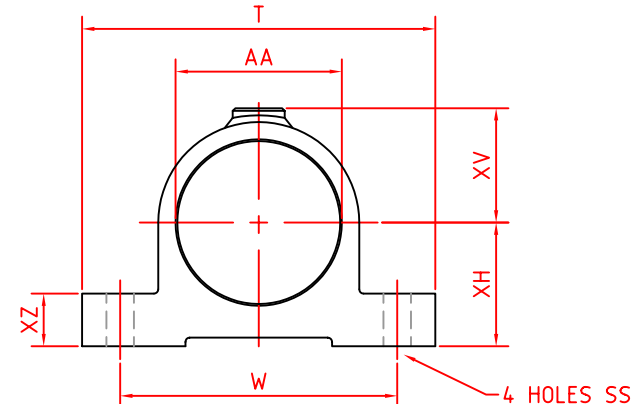
CYLINDER SIZE	EE ROD	GG THREAD	A1	A2	A3	B1	B2	B3	E	D	AP	V	VH	AT	H BSPP	AA	XV	TF	TG UNC THREAD	TH	TL	XE	XH	WE1
HR/HSR 15 1.50" BORE	0.875 22.22	3/4" - 16UN	5.875 149.23	6.375 161.93	7.25 184.15	2.375 60.33	3.375 85.73	4.25 107.95	0.875 22.22	3.125 79.37	1.125 28.57	1.25 31.75	0.75 19.05	2.00 50.80	3/8"	2.00 50.80	1.75 44.45	1.50 38.10	1/2" - 13	0.50 12.70	2.50 63.50	1.375 34.93	1.50 38.10	5.50 139.70
HR/HSR 20 2.00" BORE	1.00 25.40	3/4" - 16UN	5.875 149.23	6.375 161.93	7.375 187.33	2.875 73.03	3.75 95.25	4.75 120.65	0.875 22.22	2.75 69.85	1.125 28.57	1.125 28.57	0.75 19.05	2.00 50.80	3/8"	2.50 63.50	2.00 50.80	2.00 50.80	1/2" - 13	0.562 14.27	3.00 76.20	1.375 34.93	1.75 44.45	5.625 142.88
HR/HSR 25 2.50" BORE	1.375 34.92	1" - 14UN	6.375 161.93	6.875 174.63	7.875 200.03	3.125 79.38	4.00 101.60	5.00 127.00	1.125 28.58	3.125 79.37	1.625 41.28	1.25 31.75	0.875 22.22	2.75 69.85	1/2"	3.00 76.20	2.25 57.15	2.25 57.15	5/8" - 11	0.688 17.46	3.50 88.90	1.50 38.10	2.25 57.15	6.25 158.75
HR/HSR 30 3.00" BORE	1.75 44.45	1 1/4" - 12UN	8.125 206.38	8.125 206.38	9.625 244.48	4.00 101.60	4.50 114.30	6.00 152.40	1.25 31.75	4.00 101.60	2.00 50.80	1.375 34.92	0.875 22.22	3.25 82.55	1/2"	3.50 88.90	2.375 60.33	2.50 63.50	3/4" - 10	0.813 20.64	4.00 101.60	1.625 41.28	2.50 63.50	8.00 203.20
HR/HSR 35 3.50" BORE	1.75 44.45	1 1/4" - 12UN	8.625 219.08	8.375 212.73	10.00 254.00	4.125 104.78	4.75 120.65	6.375 161.93	1.25 31.75	4.00 101.60	2.00 50.80	1.75 44.45	0.875 22.22	3.25 82.55	3/4"	4.00 101.60	2.875 73.03	3.25 82.55	3/4" - 10	0.875 22.22	4.75 120.65	2.00 50.80	2.875 73.03	8.125 206.38
HR/HSR 40 4.00" BORE	2.00 50.80	1 1/2" - 12UN	9.375 238.13	8.875 225.43	10.625 269.88	4.375 111.13	4.875 138.83	6.625 168.28	1.375 34.92	4.50 114.30	2.25 57.15	1.875 47.63	0.875 22.22	3.625 92.08	3/4"	4.50 114.30	3.25 82.55	3.25 82.55	1" - 8	1.063 26.99	5.25 133.35	2.00 50.80	3.25 82.55	8.875 225.43
HR/HSR 45 4.50" BORE	2.00 50.80	1 1/2" - 12UN	10.125 257.18	9.625 244.48	11.375 288.93	4.75 120.65	5.625 142.88	7.375 187.33	1.375 34.92	4.50 114.30	2.25 57.15	2.25 57.15	0.875 22.22	3.625 92.08	3/4"	5.125 130.18	3.50 88.90	3.875 98.43	1" - 8	1.063 26.99	5.875 149.23	2.25 57.15	3.50 88.90	9.25 234.95
HR/HSR 50 5.00" BORE	2.50 63.50	1 3/4" - 12UN	10.625 269.88	10.625 269.88	12.625 320.68	5.00 127.00	5.875 149.23	7.875 200.03	1.50 38.10	4.875 123.83	3.00 76.20	2.25 57.15	1.375 34.93	4.50 114.30	1"	5.625 142.88	3.875 98.43	3.875 98.43	1 1/4" - 7	1.313 33.34	6.375 161.93	2.50 63.50	4.00 101.60	9.875 250.83
HR/HSR 55 5.50" BORE	2.50 63.50	1 3/4" - 12UN	11.25 285.75	11.375 288.93	13.25 336.55	5.50 139.70	6.50 165.10	8.375 212.73	1.50 38.10	5.00 127.00	3.00 76.20	2.25 57.15	1.375 34.93	4.50 114.30	1"	6.125 155.58	4.25 107.95	4.375 111.13	1 1/4" - 7	1.313 33.34	6.875 174.35	2.50 63.50	4.25 107.95	10.50 266.70
HR/HSR 60 6.00" BORE	3.00 76.20	2 1/4" - 12UN	12.00 304.80	12.00 304.80	14.00 355.60	5.875 149.22	7.00 177.80	9.00 228.60	1.50 38.10	5.125 130.18	3.50 88.90	2.50 63.50	1.375 34.93	5.00 127.00	1"	6.625 168.28	4.50 114.30	5.125 130.18	1 1/4" - 7	1.375 34.93	7.625 193.68	2.50 63.50	4.50 114.30	11.00 279.40
HR/HSR 65 6.50" BORE	3.00 76.20	2 1/4" - 12UN	12.125 307.98	12.25 311.15	14.125 358.78	5.875 149.22	7.125 180.98	9.00 228.60	1.50 38.10	5.25 133.25	3.50 88.90	2.50 63.50	1.375 34.93	5.00 127.00	1"	7.25 184.15	4.75 120.65	5.50 139.70	1 3/8" - 6	1.50 38.10	8.25 209.55	2.75 69.85	4.75 120.65	11.125 282.58
HR/HSR 70 7.00" BORE	3.50 88.90	2 1/2" - 12UN	14.50 368.30	15.00 381.00	17.75 450.85	7.25 184.15	8.50 215.90	11.25 288.75	1.50 38.10	6.00 152.40	3.50 88.90	2.75 69.85	2.00 50.80	5.00 127.00	1 1/4"	7.75 196.85	5.25 133.35	6.00 152.40	1 1/2" - 6	1.625 41.28	9.00 228.60	3.00 76.20	5.00 127.00	13.25 336.55
HR/HSR 75 7.50" BORE	3.50 88.90	2 1/2" - 12UN	15.00 381.00	15.50 393.70	18.25 463.55	7.00 177.80	8.50 215.90	11.25 288.75	1.50 38.10	6.50 165.10	3.50 88.90	3.00 76.20	2.00 50.80	5.00 127.00	1 1/4"	8.50 215.90	5.50 139.70	6.75 171.45	1 1/2" - 6	1.625 41.28	9.75 247.65	3.00 76.20	5.25 133.35	13.50 342.90
HR/HSR 80 8.00" BORE	4.00 101.60	3" - 12UN	16.125 409.58	16.375 415.93	19.25 488.95	7.875 200.03	9.125 230.68	12.00 304.80	1.50 38.10	6.50 165.10	4.00 101.60	3.25 82.55	2.25 57.15	5.50 139.70	1 1/4"	9.00 228.60	6.00 152.40	7.50 190.50	1 1/2" - 6	1.625 41.28	10.50 266.70	3.50 88.90	5.50 139.70	14.375 365.13
HR/HSR 90 9.00" BORE	4.50 114.30	3" - 12UN	17.375 441.33	17.875 454.03	20.375 517.53	8.50 215.90	10.125 257.18	12.625 320.68	1.50 38.10	7.00 177.80	4.00 101.60	3.375 85.73	2.25 57.15	5.50 139.70	1 1/4"	10.00 254.00	6.50 165.10	8.00 203.20	1 3/4" - 5	2.00 50.80	11.50 292.10	4.25 107.95	6.50 165.10	15.50 393.70
HR/HSR 100 10.00" BORE	5.00 127.00	3 3/4" - 12UN	18.125 460.38	18.50 469.90	21.00 533.40	8.625 219.08	10.25 260.35	12.75 323.85	1.50 38.10	7.50 190.50	4.375 111.13	3.50 88.90	2.25 57.15	5.875 149.22	1 1/4"	11.00 279.40	7.00 177.80	9.00 228.60	1 3/4" - 5	2.00 50.80	12.50 317.50	4.625 117.48	6.75 171.45	16.125 409.58

HR & HSH NON-CUSHIONED CYLINDERS

HR SHOWN

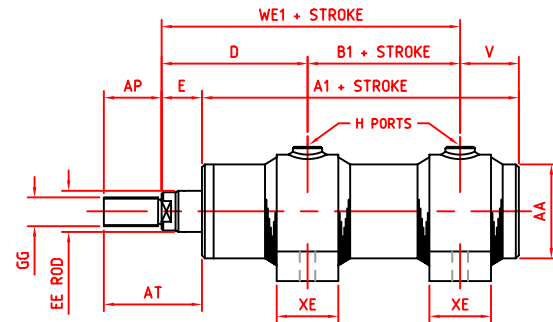


HIGH TENSILE BOLTS OR THRUST KEYS ARE
REQUIRED WHEN MOUNTING LUG MOUNTED CYLINDERS

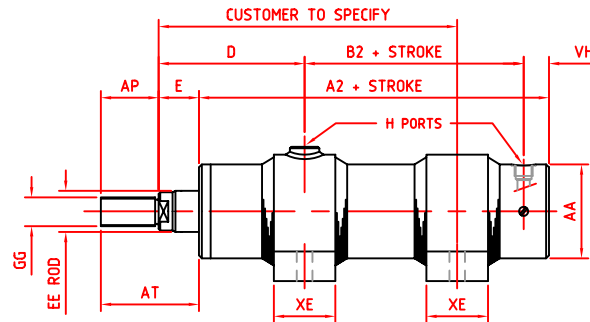


CYLINDER SIZE	EE ROD	GG THREAD	A	B	E	D	AP	V	AT	H BSPP	AA	XV	AR MIN	T	SS	W	XZ	XE	XH	WE	CYLINDER SIZE
HR/HSH 15 1.50" BORE	0.875 22.22	¾" - 16UN	5.00 127.00	1.50 38.10	0.875 22.22	3.125 79.37	1.125 28.57	1.25 31.75	2.00 50.80	¾"	2.00 50.80	1.75 44.45	0.50 12.70	5.00 127.00	⅞"	3.75 95.25	0.50 12.70	1.375 34.93	1.50 38.10	4.625 117.48	HR/HSH 15 1.50" BORE
HR/HSH 20 2.00" BORE	1.00 25.40	¾" - 16UN	4.875 123.82	1.875 47.62	0.875 22.22	2.75 69.85	1.125 28.57	1.125 28.57	2.00 50.80	¾"	2.50 63.50	2.00 50.80	0.50 12.70	5.50 139.70	⅞"	4.25 107.95	0.75 19.05	1.375 34.93	1.75 44.45	4.625 117.48	HR/HSH 20 2.00" BORE
HR/HSH 25 2.50" BORE	1.375 34.92	1" - 14UN	5.375 136.52	2.125 53.98	1.125 28.58	3.125 79.37	1.625 41.28	1.25 31.75	2.75 69.85	½"	3.00 76.20	2.25 57.15	0.75 19.05	6.50 165.10	1⅛"	5.00 127.00	1.00 25.40	1.50 38.10	2.25 57.15	5.25 133.35	HR/HSH 25 2.50" BORE
HR/HSH 30 3.00" BORE	1.75 44.45	1¼" - 12UN	6.625 168.27	2.50 63.50	1.25 31.75	4.00 101.60	2.00 50.80	1.375 34.92	3.25 82.55	½"	3.50 88.90	2.375 60.33	0.875 22.22	7.375 187.33	1⅜"	5.75 146.05	1.00 25.40	1.625 41.28	2.50 63.50	6.50 165.10	HR/HSH 30 3.00" BORE
HR/HSH 35 3.50" BORE	1.75 44.45	1¼" - 12UN	7.00 177.80	2.50 63.50	1.25 31.75	4.00 101.60	2.00 50.80	1.75 44.45	3.25 82.55	¾"	4.00 101.60	2.875 73.03	0.875 22.22	8.75 222.25	1⅝"	6.75 171.45	1.125 28.58	2.00 50.80	2.875 73.03	6.50 165.10	HR/HSH 35 3.50" BORE
HR/HSH 40 4.00" BORE	2.00 50.80	1½" - 12UN	7.625 193.67	2.625 66.68	1.375 34.92	4.50 114.30	2.25 57.15	1.875 47.63	3.625 92.08	¾"	4.50 114.30	3.25 82.55	0.875 22.22	9.50 241.30	1-⅜"	7.50 190.50	1.25 31.75	2.00 50.80	3.25 82.55	7.125 180.98	HR/HSH 40 4.00" BORE
HR/HSH 45 4.50" BORE	2.00 50.80	1½" - 12UN	8.375 212.72	3.00 76.20	1.375 34.92	4.50 114.30	2.25 57.15	2.25 57.15	3.625 92.08	¾"	5.125 130.18	3.50 88.90	0.875 22.22	10.00 254.00	1-⅝"	8.00 203.20	1.25 31.75	2.25 57.15	3.50 88.90	7.50 190.50	HR/HSH 45 4.50" BORE
HR/HSH 50 5.00" BORE	2.50 63.50	1⅝" - 12UN	8.625 219.08	3.00 76.20	1.50 38.10	4.875 123.83	3.00 76.20	2.25 57.15	4.50 114.30	1"	5.625 142.88	3.875 98.43	1.00 25.40	11.50 292.10	1-⅝"	9.00 228.60	1.375 34.93	2.50 63.50	4.00 101.60	7.875 200.03	HR/HSH 50 5.00" BORE
HR/HSH 55 5.50" BORE	2.50 63.50	1⅝" - 12UN	9.375 238.13	3.625 92.08	1.50 38.10	5.00 127.00	3.00 76.20	2.25 57.15	4.50 114.30	1"	6.125 155.58	4.25 107.95	1.00 25.40	12.00 304.80	1-⅝"	9.50 241.30	1.50 38.10	2.50 63.50	4.25 107.95	8.625 219.08	HR/HSH 55 5.50" BORE
HR/HSH 60 6.00" BORE	3.00 76.20	2¼" - 12UN	10.00 254.00	3.875 98.43	1.50 38.10	5.125 130.18	3.50 88.90	2.50 63.50	5.00 127.00	1"	6.625 168.28	4.50 114.30	1.00 25.40	12.75 323.85	1-⅝"	10.25 260.35	1.50 38.10	2.50 63.50	4.50 114.30	9.00 228.60	HR/HSH 60 6.00" BORE
HR/HSH 65 6.50" BORE	3.00 76.20	2¼" - 12UN	10.25 260.35	4.00 101.60	1.50 38.10	5.25 133.25	3.50 88.90	2.50 63.50	5.00 127.00	1"	7.25 184.15	4.75 120.65	1.00 25.40	14.25 361.95	1-⅝"	11.50 292.10	1.75 44.45	2.75 69.85	4.75 120.65	9.25 234.95	HR/HSH 65 6.50" BORE
HR/HSH 70 7.00" BORE	3.50 88.90	2½" - 12UN	11.75 298.45	4.50 114.30	1.50 38.10	6.00 152.40	3.50 88.90	2.75 69.85	5.00 127.00	1¼"	7.75 196.85	5.25 133.35	1.00 25.40	15.25 387.35	1-⅝"	12.25 311.15	1.75 44.45	3.00 76.20	5.00 127.00	10.50 266.70	HR/HSH 70 7.00" BORE
HR/HSH 75 7.50" BORE	3.50 88.90	2½" - 12UN	12.25 311.15	4.25 107.95	1.50 38.10	6.50 165.10	3.50 88.90	3.00 76.20	5.00 127.00	1¼"	8.50 215.90	5.50 139.70	1.00 25.40	16.00 406.40	1-⅝"	13.00 330.20	2.00 50.80	3.00 76.20	5.25 133.35	10.75 273.05	HR/HSH 75 7.50" BORE
HR/HSH 80 8.00" BORE	4.00 101.60	3" - 12UN	13.25 336.55	5.00 127.00	1.50 38.10	6.50 165.10	4.00 101.60	3.25 82.55	5.50 139.70	1¼"	9.00 228.60	6.00 152.40	1.00 25.40	17.00 431.80	1-⅝"	13.75 349.25	2.00 50.80	3.50 88.90	5.50 139.70	11.50 292.10	HR/HSH 80 8.00" BORE
HR/HSH 90 9.00" BORE	4.50 114.30	3" - 12UN	14.875 377.83	6.00 152.40	1.50 38.10	7.00 177.80	4.00 101.60	3.375 85.73	5.50 139.70	1¼"	10.00 254.00	6.50 165.10	1.00 25.40	20.00 508.00	1-⅝"	16.00 406.40	2.25 57.15	4.25 107.95	6.50 165.10	13.00 330.20	HR/HSH 90 9.00" BORE
HR/HSH 100 10.00" BORE	5.00 127.00	3¾" - 12UN	15.625 396.88	6.125 155.58	1.50 38.10	7.50 190.50	4.375 111.13	3.50 88.90	5.875 149.22	1¼"	11.00 279.40	7.00 177.80	1.00 25.40	21.00 533.40	1-⅝"	17.00 431.80	2.25 57.15	4.625 117.48	6.75 171.45	13.625 346.08	HR/HSH 100 10.00" BORE

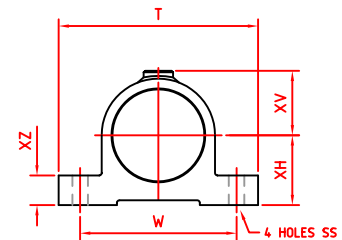
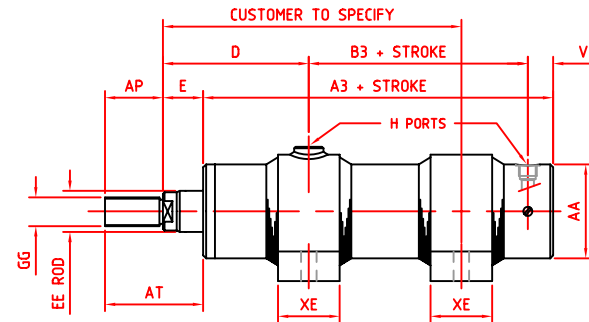
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CUSHION REAR CR



CUSHION FRONT & REAR CF/CR



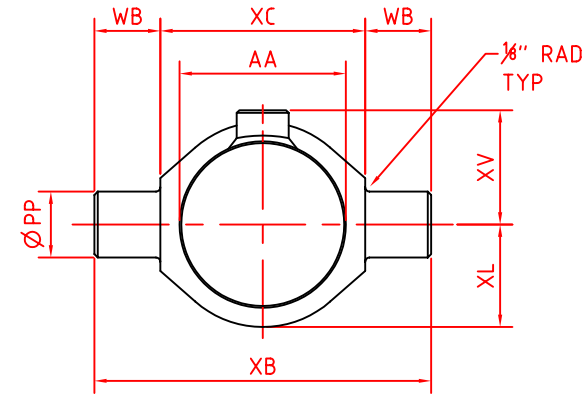
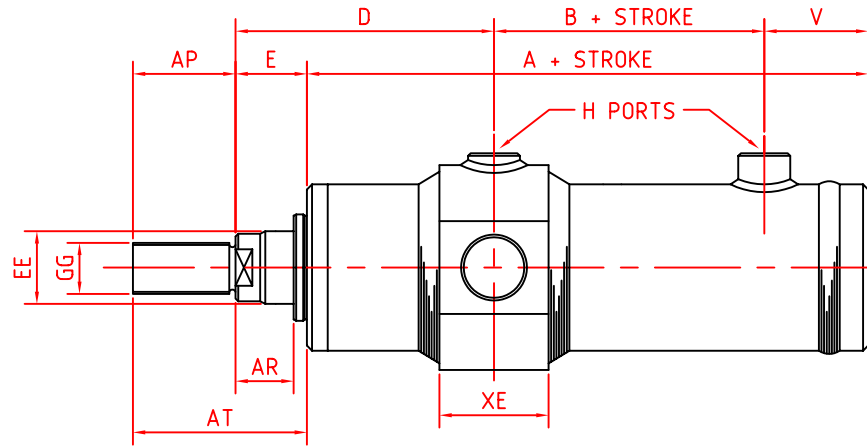
CYLINDER SIZE	EE ROD	GG THREAD	A1	A2	A3	B1	B2	B3	E	D	AP	V	VH	AT	H BSPP	AA	XV	T	SS	W	XZ	XE	XH	WE1
HR/HSB 15 1.50" BORE	0.875 22.22	3/4" - 16UN	5.875 149.23	6.375 161.93	7.25 184.15	2.375 60.33	3.375 85.73	4.25 107.95	0.875 22.22	3.125 79.37	1.125 28.57	1.25 31.75	0.75 19.05	2.00 50.80	3/8"	2.00 50.80	1.75 44.45	5.00 127.00	9/16"	3.75 95.25	0.50 12.70	1.375 34.93	1.50 38.10	5.50 139.70
HR/HSB 20 2.00" BORE	1.00 25.40	3/4" - 16UN	5.875 149.23	6.375 161.93	7.375 187.33	2.875 73.03	3.75 95.25	4.75 120.65	0.875 22.22	2.75 69.85	1.125 28.57	1.125 28.57	0.75 19.05	2.00 50.80	3/8"	2.50 63.50	2.00 50.80	5.50 139.70	9/16"	4.25 107.95	0.75 19.05	1.375 34.93	1.75 44.45	5.625 142.88
HR/HSB 25 2.50" BORE	1.375 34.92	1" - 14UN	6.375 161.93	6.875 174.63	7.875 200.03	3.125 79.38	4.00 101.60	5.00 127.00	1.125 28.58	3.125 79.37	1.625 41.28	1.25 31.75	0.875 22.22	2.75 69.85	1/2"	3.00 76.20	2.25 57.15	6.50 165.10	1 1/16"	5.00 127.00	1.00 25.40	1.50 38.10	2.25 57.15	6.25 158.75
HR/HSB 30 3.00" BORE	1.75 44.45	1 1/4" - 12UN	8.125 206.38	8.125 206.38	9.625 244.48	4.00 101.60	4.50 114.30	6.00 152.40	1.25 31.75	4.00 101.60	2.00 50.80	1.375 34.92	0.875 22.22	3.25 82.55	1/2"	3.50 88.90	2.375 60.33	7.375 187.33	1 3/16"	5.75 146.05	1.00 25.40	1.625 41.28	2.50 63.50	8.00 203.20
HR/HSB 35 3.50" BORE	1.75 44.45	1 1/4" - 12UN	8.625 219.08	8.375 212.73	10.00 254.00	4.125 104.78	4.75 120.65	6.375 161.93	1.25 31.75	4.00 101.60	2.00 50.80	1.75 44.45	0.875 22.22	3.25 82.55	3/4"	4.00 101.60	2.875 73.03	8.75 222.25	1 5/16"	6.75 171.45	1.125 28.58	2.00 50.80	2.875 73.03	8.125 206.38
HR/HSB 40 4.00" BORE	2.00 50.80	1 1/2" - 12UN	9.375 238.13	8.875 225.43	10.625 269.88	4.375 111.13	4.875 138.83	6.625 168.28	1.375 34.92	4.50 114.30	2.25 57.15	1.875 47.63	0.875 22.22	3.625 92.08	3/4"	4.50 114.30	3.25 82.55	9.50 241.30	1 1/8"	7.50 190.50	1.25 31.75	2.00 50.80	3.25 82.55	8.875 225.43
HR/HSB 45 4.50" BORE	2.00 50.80	1 1/2" - 12UN	10.125 257.18	9.625 244.48	11.375 288.93	4.75 120.65	5.625 142.88	7.375 187.33	1.375 34.92	4.50 114.30	2.25 57.15	2.25 57.15	0.875 22.22	3.625 92.08	3/4"	5.125 130.18	3.50 88.90	10.00 254.00	1 1/8"	8.00 203.20	1.25 31.75	2.25 57.15	3.50 88.90	9.25 234.95
HR/HSB 50 5.00" BORE	2.50 63.50	1 3/8" - 12UN	10.625 269.88	10.625 269.88	12.625 320.68	5.00 127.00	5.875 149.23	7.875 200.03	1.50 38.10	4.875 123.83	3.00 76.20	2.25 57.15	1.375 34.93	4.50 114.30	1"	5.625 142.88	3.875 98.43	11.50 292.10	1 5/16"	9.00 228.60	1.375 34.93	2.50 63.50	4.00 101.60	9.875 250.83
HR/HSB 55 5.50" BORE	2.50 63.50	1 3/8" - 12UN	11.25 285.75	11.375 288.93	13.25 336.55	5.50 139.70	6.50 165.10	8.375 212.73	1.50 38.10	5.00 127.00	3.00 76.20	2.25 57.15	1.375 34.93	4.50 114.30	1"	6.125 155.58	4.25 107.95	12.00 304.80	1 5/16"	9.50 241.30	1.50 38.10	2.50 63.50	4.25 107.95	10.50 266.70
HR/HSB 60 6.00" BORE	3.00 76.20	2 1/4" - 12UN	12.00 304.80	12.00 304.80	14.00 355.60	5.875 149.22	7.00 177.80	9.00 228.60	1.50 38.10	5.125 130.18	3.50 88.90	2.50 63.50	1.375 34.93	5.00 127.00	1"	6.625 168.28	4.50 114.30	12.75 323.85	1 5/8"	10.25 260.35	1.50 38.10	2.50 63.50	4.50 114.30	11.00 279.40
HR/HSB 65 6.50" BORE	3.00 76.20	2 1/4" - 12UN	12.125 307.98	12.25 311.15	14.125 358.78	5.875 149.22	7.125 180.98	9.00 228.60	1.50 38.10	5.25 133.25	3.50 88.90	2.50 63.50	1.375 34.93	5.00 127.00	1"	7.25 184.15	4.75 120.65	14.25 361.95	1 7/16"	11.50 292.10	1.75 44.45	2.75 69.85	4.75 120.65	11.125 282.58
HR/HSB 70 7.00" BORE	3.50 88.90	2 1/2" - 12UN	14.50 368.30	15.00 381.00	17.75 450.85	7.25 184.15	8.50 215.90	11.25 288.75	1.50 38.10	6.00 152.40	3.50 88.90	2.75 69.85	2.00 50.80	5.00 127.00	1 1/4"	7.75 196.85	5.25 133.35	15.25 387.35	1 3/8"	12.25 311.15	1.75 44.45	3.00 76.20	5.00 127.00	13.25 336.55
HR/HSB 75 7.50" BORE	3.50 88.90	2 1/2" - 12UN	15.00 381.00	15.50 393.70	18.25 463.55	7.00 177.80	8.50 215.90	11.25 288.75	1.50 38.10	6.50 165.10	3.50 88.90	3.00 76.20	2.00 50.80	5.00 127.00	1 1/4"	8.50 215.90	5.50 139.70	16.00 406.40	1 3/8"	13.00 330.20	2.00 50.80	3.00 76.20	5.25 133.35	13.50 342.90
HR/HSB 80 8.00" BORE	4.00 101.60	3" - 12UN	16.125 409.58	16.375 415.93	19.25 488.95	7.875 200.03	9.125 230.48	12.00 304.80	1.50 38.10	6.50 165.10	4.00 101.60	3.25 82.55	2.25 57.15	5.50 139.70	1 1/4"	9.00 228.60	6.00 152.40	17.00 431.80	1 3/8"	13.75 349.25	2.00 50.80	3.50 88.90	5.50 139.70	14.375 365.13
HR/HSB 90 9.00" BORE	4.50 114.30	3" - 12UN	17.375 441.33	17.875 454.03	20.375 517.53	8.50 215.90	10.125 257.18	12.625 320.68	1.50 38.10	7.00 177.80	4.00 101.60	3.375 85.73	2.25 57.15	5.50 139.70	1 1/4"	10.00 254.00	6.50 165.10	20.00 508.00	1 13/16"	16.00 406.40	2.25 57.15	4.25 107.95	6.50 165.10	15.50 393.70
HR/HSB 100 10.00" BORE	5.00 127.00	3 3/4" - 12UN	18.125 460.38	18.50 469.90	21.00 533.40	8.625 219.08	10.25 260.35	12.75 323.85	1.50 38.10	7.50 190.50	4.375 111.13	3.50 88.90	2.25 57.15	5.875 149.22	1 1/4"	11.00 279.40	7.00 177.80	21.00 533.40	1 13/16"	17.00 431.80	2.25 57.15	4.625 117.48	6.75 171.45	16.125 409.58

HR & HSH NON-CUSHIONED CYLINDERS

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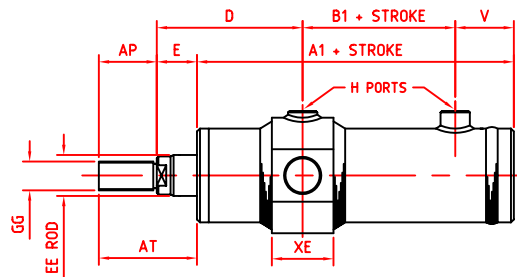
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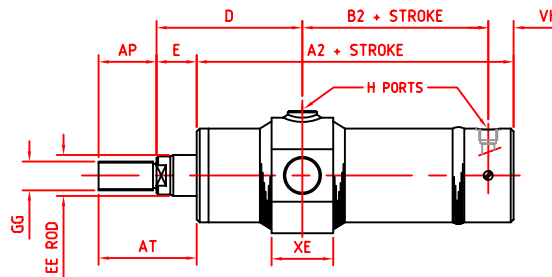


CYLINDER SIZE	EE ROD	GG THREAD	A	B	E	D	AP	V	AT	H BSPP	AA	XV	AR MIN	PP	XB	XC	XE	XL	WB	CYLINDER SIZE
HR/HSR 15 1.50" BORE	0.875 22.22	3/4" - 16UN	5.00 127.00	1.50 38.10	0.875 22.22	3.125 79.37	1.125 28.57	1.25 31.75	2.00 50.80	3/8"	2.00 50.80	1.75 44.45	0.50 12.70	1.00 25.40	4.50 114.30	2.50 63.50	1.375 34.93	1.25 31.75	1.00 25.40	HR/HSR 15 1.50" BORE
HR/HSR 20 2.00" BORE	1.00 25.40	3/4" - 16UN	4.875 123.82	1.875 47.62	0.875 22.22	2.75 69.85	1.125 28.57	1.125 28.57	2.00 50.80	3/8"	2.50 63.50	2.00 50.80	0.50 12.70	1.25 31.75	5.50 139.70	3.00 76.20	1.375 34.93	1.50 38.10	1.25 31.75	HR/HSR 20 2.00" BORE
HR/HSR 25 2.50" BORE	1.375 34.92	1" - 14UN	5.375 136.52	2.125 53.98	1.125 28.58	3.125 79.37	1.625 41.28	1.25 31.75	2.75 69.85	1/2"	3.00 76.20	2.25 57.15	0.75 19.05	1.375 34.93	6.25 158.75	3.50 88.90	1.50 38.10	1.75 44.45	1.375 34.93	HR/HSR 25 2.50" BORE
HR/HSR 30 3.00" BORE	1.75 44.45	1 1/4" - 12UN	6.625 168.27	2.50 63.50	1.25 31.75	4.00 101.60	2.00 50.80	1.375 34.92	3.25 82.55	1/2"	3.50 88.90	2.375 60.33	0.875 22.22	1.50 38.10	7.00 177.80	4.00 101.60	1.625 41.28	2.125 53.98	1.50 38.10	HR/HSR 30 3.00" BORE
HR/HSR 35 3.50" BORE	1.75 44.45	1 1/4" - 12UN	7.00 177.80	2.50 63.50	1.25 31.75	4.00 101.60	2.00 50.80	1.75 44.45	3.25 82.55	3/4"	4.00 101.60	2.875 73.03	0.875 22.22	1.75 44.45	8.25 209.55	4.75 120.65	2.00 50.80	2.375 60.33	1.75 44.45	HR/HSR 35 3.50" BORE
HR/HSR 40 4.00" BORE	2.00 50.80	1 1/2" - 12UN	7.625 193.67	2.625 66.68	1.375 34.92	4.50 114.30	2.25 57.15	1.875 47.63	3.625 92.08	3/4"	4.50 114.30	3.25 82.55	0.875 22.22	1.75 44.45	8.75 222.25	5.25 133.35	2.00 50.80	2.625 66.68	1.75 44.45	HR/HSR 40 4.00" BORE
HR/HSR 45 4.50" BORE	2.00 50.80	1 1/2" - 12UN	8.375 212.72	3.00 76.20	1.375 34.92	4.50 114.30	2.25 57.15	2.25 57.15	3.625 92.08	3/4"	5.125 130.18	3.50 88.90	0.875 22.22	2.00 50.80	9.875 250.83	5.875 149.23	2.25 57.15	2.938 74.61	2.00 50.80	HR/HSR 45 4.50" BORE
HR/HSR 50 5.00" BORE	2.50 63.50	1 3/8" - 12UN	8.625 219.08	3.00 76.20	1.50 38.10	4.875 123.83	3.00 76.20	2.25 57.15	4.50 114.30	1"	5.625 142.88	3.875 98.43	1.00 25.40	2.00 50.80	10.375 263.52	6.375 161.93	2.50 63.50	3.313 84.14	2.00 50.80	HR/HSR 50 5.00" BORE
HR/HSR 55 5.50" BORE	2.50 63.50	1 3/8" - 12UN	9.375 238.13	3.625 92.08	1.50 38.10	5.00 127.00	3.00 76.20	2.25 57.15	4.50 114.30	1"	6.125 155.58	4.25 107.95	1.00 25.40	2.25 57.15	11.375 288.93	6.875 174.63	2.50 63.50	3.438 87.31	2.25 57.15	HR/HSR 55 5.50" BORE
HR/HSR 60 6.00" BORE	3.00 76.20	2 1/4" - 12UN	10.00 254.00	3.875 98.43	1.50 38.10	5.125 130.18	3.50 88.90	2.50 63.50	5.00 127.00	1"	6.625 168.28	4.50 114.30	1.00 25.40	2.25 57.15	12.125 307.98	7.625 193.68	2.50 63.50	3.813 96.84	2.25 57.15	HR/HSR 60 6.00" BORE
HR/HSR 65 6.50" BORE	3.00 76.20	2 1/4" - 12UN	10.25 260.35	4.00 101.60	1.50 38.10	5.25 133.25	3.50 88.90	2.50 63.50	5.00 127.00	1"	7.25 184.15	4.75 120.65	1.00 25.40	2.50 63.50	13.25 336.55	8.25 209.55	2.75 69.85	4.125 104.78	2.50 63.50	HR/HSR 65 6.50" BORE
HR/HSR 70 7.00" BORE	3.50 88.90	2 1/2" - 12UN	11.75 298.45	4.50 114.30	1.50 38.10	6.00 152.40	3.50 88.90	2.75 69.85	5.00 127.00	1 1/4"	7.75 196.85	5.25 133.35	1.00 25.40	2.75 69.85	14.50 368.30	9.00 228.60	3.00 76.20	4.50 114.30	2.75 69.85	HR/HSR 70 7.00" BORE
HR/HSR 75 7.50" BORE	3.50 88.90	2 1/2" - 12UN	12.25 311.15	4.25 107.95	1.50 38.10	6.50 165.10	3.50 88.90	3.00 76.20	5.00 127.00	1 1/4"	8.50 215.90	5.50 139.70	1.00 25.40	2.75 69.85	15.25 387.35	9.75 247.65	3.00 76.20	4.875 123.83	2.75 69.85	HR/HSR 75 7.50" BORE
HR/HSR 80 8.00" BORE	4.00 101.60	3" - 12UN	13.25 336.55	5.00 127.00	1.50 38.10	6.50 165.10	4.00 101.60	3.25 82.55	5.50 139.70	1 1/4"	9.00 228.60	6.00 152.40	1.00 25.40	3.25 82.55	17.00 431.80	10.50 266.70	3.50 88.90	5.25 133.35	3.25 82.55	HR/HSR 80 8.00" BORE
HR/HSR 90 9.00" BORE	4.50 114.30	3" - 12UN	14.875 377.83	6.00 152.40	1.50 38.10	7.00 177.80	4.00 101.60	3.375 85.73	5.50 139.70	1 1/4"	10.00 254.00	6.50 165.10	1.00 25.40	4.00 101.60	20.00 508.00	12.00 304.80	4.25 107.95	6.00 152.40	4.00 101.60	HR/HSR 90 9.00" BORE
HR/HSR 100 10.00" BORE	5.00 127.00	3 3/4" - 12UN	15.625 396.88	6.125 155.58	1.50 38.10	7.50 190.50	4.375 111.13	3.50 88.90	5.875 149.22	1 1/4"	11.00 279.40	7.00 177.80	1.00 25.40	4.50 114.30	22.00 558.80	13.00 330.20	4.625 117.48	6.50 165.10	4.50 114.30	HR/HSR 100 10.00" BORE

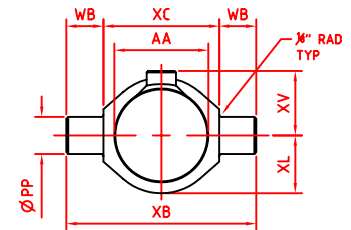
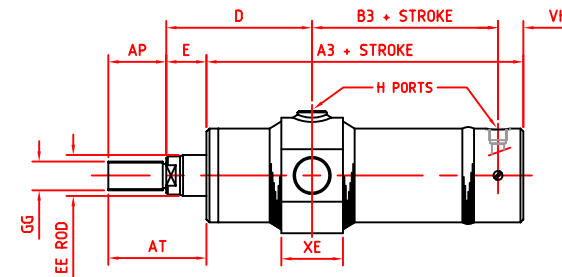
CUSHION FRONT CF



CUSHION REAR CR



CUSHION FRONT & REAR CF/CR

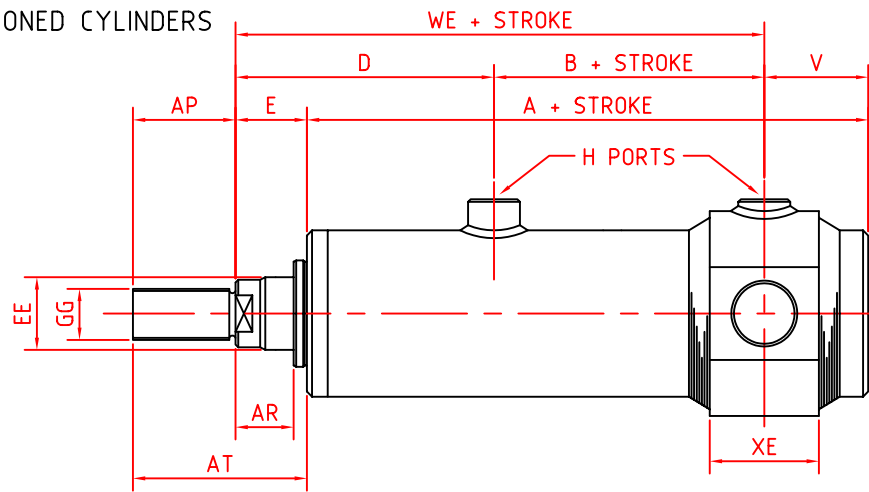


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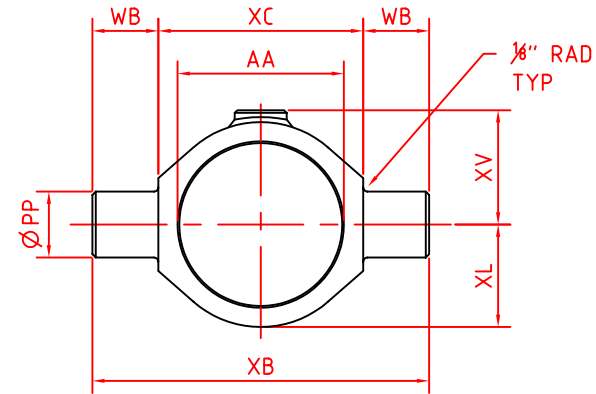
CYLINDER SIZE	EE ROD	GG THREAD	A1	A2	A3	B1	B2	B3	E	D	AP	V	VH	AT	H BSPP	AA	XV	PP	XB	XC	XE	XL	WB
HR/SHS 15 1.50" BORE	0.875 22.22	3/4" - 16UN	5.875 149.23	6.375 161.93	7.25 184.15	2.375 60.33	3.375 85.73	4.25 107.95	0.875 22.22	3.125 79.37	1.125 28.57	1.25 31.75	0.75 19.05	2.00 50.80	3/8"	2.00 50.80	1.75 44.45	1.00 25.40	4.50 114.30	2.50 63.50	1.375 34.93	1.25 31.75	1.00 25.40
HR/SHS 20 2.00" BORE	1.00 25.40	3/4" - 16UN	5.875 149.23	6.375 161.93	7.375 187.33	2.875 73.03	3.75 95.25	4.75 120.65	0.875 22.22	2.75 69.85	1.125 28.57	1.125 28.57	0.75 19.05	2.00 50.80	3/8"	2.50 63.50	2.00 50.80	1.25 31.75	5.50 139.70	3.00 76.20	1.375 34.93	1.50 38.10	1.25 31.75
HR/SHS 25 2.50" BORE	1.375 34.92	1" - 14UN	6.375 161.93	6.875 174.63	7.875 200.03	3.125 79.38	4.00 101.60	5.00 127.00	1.125 28.58	3.125 79.37	1.625 41.28	1.25 31.75	0.875 22.22	2.75 69.85	1/2"	3.00 76.20	2.25 57.15	1.375 34.93	6.25 158.75	3.50 88.90	1.50 38.10	1.75 44.45	1.375 34.93
HR/SHS 30 3.00" BORE	1.75 44.45	1 1/4" - 12UN	8.125 206.38	8.125 206.38	9.625 244.48	4.00 101.60	4.50 114.30	6.00 152.40	1.25 31.75	4.00 101.60	2.00 50.80	1.375 34.92	0.875 22.22	3.25 82.55	1/2"	3.50 88.90	2.375 60.33	1.50 38.10	7.00 177.80	4.00 101.60	1.625 41.28	2.125 53.98	1.50 38.10
HR/SHS 35 3.50" BORE	1.75 44.45	1 1/4" - 12UN	8.625 219.08	8.375 212.73	10.00 254.00	4.125 104.78	4.75 120.65	6.375 161.93	1.25 31.75	4.00 101.60	2.00 50.80	1.75 44.45	0.875 22.22	3.25 82.55	3/4"	4.00 101.60	2.875 73.03	1.75 44.45	8.25 209.55	4.75 120.65	2.00 50.80	2.375 60.33	1.75 44.45
HR/SHS 40 4.00" BORE	2.00 50.80	1 1/2" - 12UN	9.375 238.13	8.875 225.43	10.625 269.88	4.375 111.13	4.875 138.83	6.625 168.28	1.375 34.92	4.50 114.30	2.25 57.15	1.875 47.63	0.875 22.22	3.625 92.08	3/4"	4.50 114.30	3.25 82.55	1.75 44.45	8.75 222.25	5.25 133.35	2.00 50.80	2.625 66.68	1.75 44.45
HR/SHS 45 4.50" BORE	2.00 50.80	1 1/2" - 12UN	10.125 257.18	9.625 244.48	11.375 288.93	4.75 120.65	5.625 142.88	7.375 187.33	1.375 34.92	4.50 114.30	2.25 57.15	2.25 57.15	0.875 22.22	3.625 92.08	3/4"	5.125 130.18	3.50 88.90	2.00 50.80	9.875 250.83	5.875 149.23	2.25 57.15	2.938 74.61	2.00 50.80
HR/SHS 50 5.00" BORE	2.50 63.50	1 3/8" - 12UN	10.625 269.88	10.625 269.88	12.625 320.68	5.00 127.00	5.875 149.23	7.875 200.03	1.50 38.10	4.875 123.83	3.00 76.20	2.25 57.15	1.375 34.93	4.50 114.30	1"	5.625 142.88	3.875 98.43	2.00 50.80	10.375 263.52	6.375 161.93	2.50 63.50	3.313 84.14	2.00 50.80
HR/SHS 55 5.50" BORE	2.50 63.50	1 3/8" - 12UN	11.25 285.75	11.375 288.93	13.25 336.55	5.50 139.70	6.50 165.10	8.375 212.73	1.50 38.10	5.00 127.00	3.00 76.20	2.25 57.15	1.375 34.93	4.50 114.30	1"	6.125 155.58	4.25 107.95	2.25 57.15	11.375 288.93	6.875 174.63	2.50 63.50	3.438 87.31	2.25 57.15
HR/SHS 60 6.00" BORE	3.00 76.20	2 1/4" - 12UN	12.00 304.80	12.00 304.80	14.00 355.60	5.875 149.22	7.00 177.80	9.00 228.60	1.50 38.10	5.125 130.18	3.50 88.90	2.50 63.50	1.375 34.93	5.00 127.00	1"	6.625 168.28	4.50 114.30	2.25 57.15	12.125 307.98	7.625 193.68	2.50 63.50	3.813 96.84	2.25 57.15
HR/SHS 65 6.50" BORE	3.00 76.20	2 1/4" - 12UN	12.125 307.98	12.25 311.15	14.125 358.78	5.875 149.22	7.125 180.98	9.00 228.60	1.50 38.10	5.25 133.25	3.50 88.90	2.50 63.50	1.375 34.93	5.00 127.00	1"	7.25 184.15	4.75 120.65	2.50 63.50	13.25 336.55	8.25 209.55	2.75 69.85	4.125 104.78	2.50 63.50
HR/SHS 70 7.00" BORE	3.50 88.90	2 1/2" - 12UN	14.50 368.30	15.00 381.00	17.75 450.85	7.25 184.15	8.50 215.90	11.25 228.75	1.50 38.10	6.00 152.40	3.50 88.90	2.75 69.85	2.00 50.80	5.00 127.00	1 1/4"	7.75 196.85	5.25 133.35	2.75 69.85	14.50 368.30	9.00 228.60	3.00 76.20	4.50 114.30	2.75 69.85
HR/SHS 75 7.50" BORE	3.50 88.90	2 1/2" - 12UN	15.00 381.00	15.50 393.70	18.25 463.55	7.00 177.80	8.50 215.90	11.25 228.75	1.50 38.10	6.50 165.10	3.50 88.90	3.00 76.20	2.00 50.80	5.00 127.00	1 1/4"	8.50 215.90	5.50 139.70	2.75 69.85	15.25 387.35	9.75 247.65	3.00 76.20	4.875 123.83	2.75 69.85
HR/SHS 80 8.00" BORE	4.00 101.60	3" - 12UN	16.125 409.58	16.375 415.93	19.25 488.95	7.875 200.03	9.125 10.125	12.00 304.80	1.50 38.10	6.50 165.10	4.00 101.60	3.25 82.55	2.25 57.15	5.50 139.70	1 1/4"	9.00 228.60	6.00 152.40	3.25 82.55	17.00 431.80	10.50 266.70	3.50 88.90	5.25 133.35	3.25 82.55
HR/SHS 90 9.00" BORE	4.50 114.30	3" - 12UN	17.375 441.33	17.875 454.03	20.375 517.53	8.50 215.90	10.125 257.18	12.625 320.68	1.50 38.10	7.00 177.80	4.00 101.60	3.375 85.73	2.25 57.15	5.50 139.70	1 1/4"	10.00 254.00	6.50 165.10	4.00 101.60	20.00 508.00	12.00 304.80	4.25 107.95	6.00 152.40	4.00 101.60
HR/SHS 100 10.00" BORE	5.00 127.00	3 3/4" - 12UN	18.125 460.38	18.50 469.90	21.00 533.40	8.625 219.08	10.25 260.35	12.75 323.85	1.50 38.10	7.50 190.50	4.375 111.13	3.50 88.90	2.25 57.15	5.875 149.22	1 1/4"	11.00 279.40	7.00 177.80	4.50 114.30	22.00 558.80	13.00 330.20	4.625 117.48	6.50 165.10	4.50 114.30

HR & HSH NON-CUSHIONED CYLINDERS

HR SHOWN



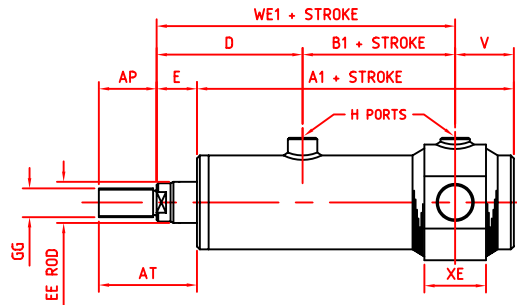
FIT FOR JOURNAL PP : USE BS 1916 C f8



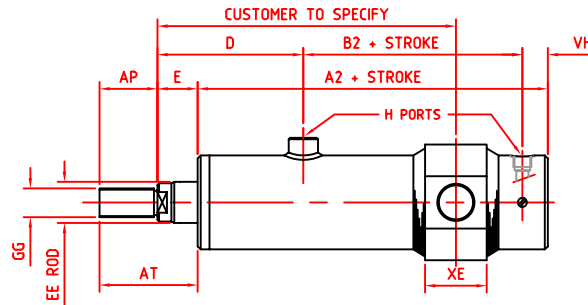
CYLINDER SIZE	EE ROD	GG THREAD	A	B	E	D	AP	V	AT	H BSPP	AA	XV	AR MIN	PP	XB	XC	XE	XL	WB	WE	CYLINDER SIZE
HR/HSH 15 1.50" BORE	0.875 22.22	3/4" - 16UN	5.00 127.00	1.50 38.10	0.875 22.22	3.125 79.37	1.125 28.57	1.25 31.75	2.00 50.80	3/8"	2.00 50.80	1.75 44.45	0.50 12.70	1.00 25.40	4.50 114.30	2.50 63.50	1.375 34.93	1.25 31.75	1.00 25.40	4.625 117.48	HR/HSH 15 1.50" BORE
HR/HSH 20 2.00" BORE	1.00 25.40	3/4" - 16UN	4.875 123.82	1.875 47.62	0.875 22.22	2.75 69.85	1.125 28.57	1.125 28.57	2.00 50.80	3/8"	2.50 63.50	2.00 50.80	0.50 12.70	1.25 31.75	5.50 139.70	3.00 76.20	1.375 34.93	1.50 38.10	1.25 31.75	4.625 117.48	HR/HSH 20 2.00" BORE
HR/HSH 25 2.50" BORE	1.375 34.92	1" - 14UN	5.375 136.52	2.125 53.98	1.125 28.58	3.125 79.37	1.625 41.28	1.25 31.75	2.75 69.85	1/2"	3.00 76.20	2.25 57.15	0.75 19.05	1.375 34.93	6.25 158.75	3.50 88.90	1.50 38.10	1.75 44.45	1.375 34.93	5.25 133.35	HR/HSH 25 2.50" BORE
HR/HSH 30 3.00" BORE	1.75 44.45	1 1/4" - 12UN	6.625 168.27	2.50 63.50	1.25 31.75	4.00 101.60	2.00 50.80	1.375 34.92	3.25 82.55	1/2"	3.50 88.90	2.375 60.33	0.875 22.22	1.50 38.10	7.00 177.80	4.00 101.60	1.625 41.28	2.125 53.98	1.50 38.10	6.50 165.10	HR/HSH 30 3.00" BORE
HR/HSH 35 3.50" BORE	1.75 44.45	1 1/4" - 12UN	7.00 177.80	2.50 63.50	1.25 31.75	4.00 101.60	2.00 50.80	1.75 44.45	3.25 82.55	3/4"	4.00 101.60	2.875 73.03	0.875 22.22	1.75 44.45	8.25 209.55	4.75 120.65	2.00 50.80	2.375 60.33	1.75 44.45	6.50 165.10	HR/HSH 35 3.50" BORE
HR/HSH 40 4.00" BORE	2.00 50.80	1 1/2" - 12UN	7.625 193.67	2.625 66.68	1.375 34.92	4.50 114.30	2.25 57.15	1.875 47.63	3.625 92.08	3/4"	4.50 114.30	3.25 82.55	0.875 22.22	1.75 44.45	8.75 222.25	5.25 133.35	2.00 50.80	2.625 66.68	1.75 44.45	7.125 180.98	HR/HSH 40 4.00" BORE
HR/HSH 45 4.50" BORE	2.00 50.80	1 1/2" - 12UN	8.375 212.72	3.00 76.20	1.375 34.92	4.50 114.30	2.25 57.15	2.25 57.15	3.625 92.08	3/4"	5.125 130.18	3.50 88.90	0.875 22.22	2.00 50.80	9.875 250.83	5.875 149.23	2.25 57.15	2.938 74.61	2.00 50.80	7.50 190.50	HR/HSH 45 4.50" BORE
HR/HSH 50 5.00" BORE	2.50 63.50	1 3/8" - 12UN	8.625 219.08	3.00 76.20	1.50 38.10	4.875 123.83	3.00 76.20	2.25 57.15	4.50 114.30	1"	5.625 142.88	3.875 98.43	1.00 25.40	2.25 57.15	10.375 263.52	6.375 161.93	2.50 63.50	3.313 84.14	2.00 50.80	7.875 200.03	HR/HSH 50 5.00" BORE
HR/HSH 55 5.50" BORE	2.50 63.50	1 3/8" - 12UN	9.375 238.13	3.625 92.08	1.50 38.10	5.00 127.00	3.00 76.20	2.25 57.15	4.50 114.30	1"	6.125 155.58	4.25 107.95	1.00 25.40	2.25 57.15	11.375 288.93	6.875 174.63	2.50 63.50	3.438 87.31	2.25 57.15	8.625 219.08	HR/HSH 55 5.50" BORE
HR/HSH 60 6.00" BORE	3.00 76.20	2 1/4" - 12UN	10.00 254.00	3.875 98.43	1.50 38.10	5.125 130.18	3.50 88.90	2.50 63.50	5.00 127.00	1"	6.625 168.28	4.50 114.30	1.00 25.40	2.25 57.15	12.125 307.98	7.625 193.68	2.50 63.50	3.813 96.84	2.25 57.15	9.00 228.60	HR/HSH 60 6.00" BORE
HR/HSH 65 6.50" BORE	3.00 76.20	2 1/4" - 12UN	10.25 260.35	4.00 101.60	1.50 38.10	5.25 133.25	3.50 88.90	2.50 63.50	5.00 127.00	1"	7.25 184.15	4.75 120.65	1.00 25.40	2.50 63.50	13.25 336.55	8.25 209.55	2.75 69.85	4.125 104.78	2.50 63.50	9.25 234.95	HR/HSH 65 6.50" BORE
HR/HSH 70 7.00" BORE	3.50 88.90	2 1/2" - 12UN	11.75 298.45	4.50 114.30	1.50 38.10	6.00 152.40	3.50 88.90	2.75 69.85	5.00 127.00	1 1/4"	7.75 196.85	5.25 133.35	1.00 25.40	2.75 69.85	14.50 368.30	9.00 228.60	3.00 76.20	4.50 114.30	2.75 69.85	10.50 266.70	HR/HSH 70 7.00" BORE
HR/HSH 75 7.50" BORE	3.50 88.90	2 1/2" - 12UN	12.25 311.15	4.25 107.95	1.50 38.10	6.50 165.10	3.50 88.90	3.00 76.20	5.00 127.00	1 1/4"	8.50 215.90	5.50 139.70	1.00 25.40	2.75 69.85	15.25 387.35	9.75 247.65	3.00 76.20	4.875 123.83	2.75 69.85	10.75 273.05	HR/HSH 75 7.50" BORE
HR/HSH 80 8.00" BORE	4.00 101.60	3" - 12UN	13.25 336.55	5.00 127.00	1.50 38.10	6.50 165.10	4.00 101.60	3.25 82.55	5.50 139.70	1 1/4"	9.00 228.60	6.00 152.40	1.00 25.40	3.25 82.55	17.00 431.80	10.50 266.70	3.50 88.90	5.25 133.35	3.25 82.55	11.50 292.10	HR/HSH 80 8.00" BORE
HR/HSH 90 9.00" BORE	4.50 114.30	3" - 12UN	14.875 377.83	6.00 152.40	1.50 38.10	7.00 177.80	4.00 101.60	3.375 85.73	5.50 139.70	1 1/4"	10.00 254.00	6.50 165.10	1.00 25.40	4.00 101.60	20.00 508.00	12.00 304.80	4.25 107.95	6.00 152.40	4.00 101.60	13.00 330.20	HR/HSH 90 9.00" BORE
HR/HSH 100 10.00" BORE	5.00 127.00	3 3/4" - 12UN	15.625 396.88	6.125 155.58	1.50 38.10	7.50 190.50	4.375 111.13	3.50 88.90	5.875 149.22	1 1/4"	11.00 279.40	7.00 177.80	1.00 25.40	4.50 114.30	22.00 558.80	13.00 330.20	4.625 117.48	6.50 165.10	4.50 114.30	13.625 346.08	HR/HSH 100 10.00" BORE

HSH CUSHIONED CYLINDERS

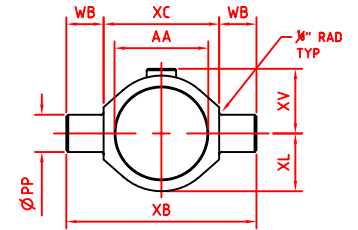
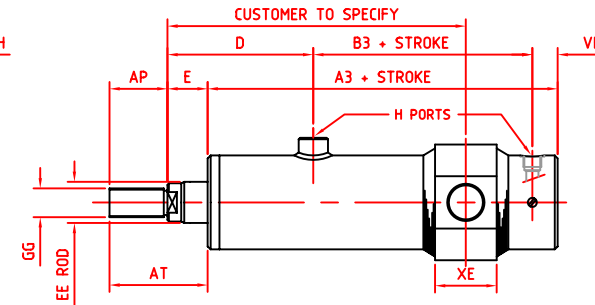
CUSHION FRONT CF



CUSHION REAR CR



CUSHION FRONT & REAR CF/CR



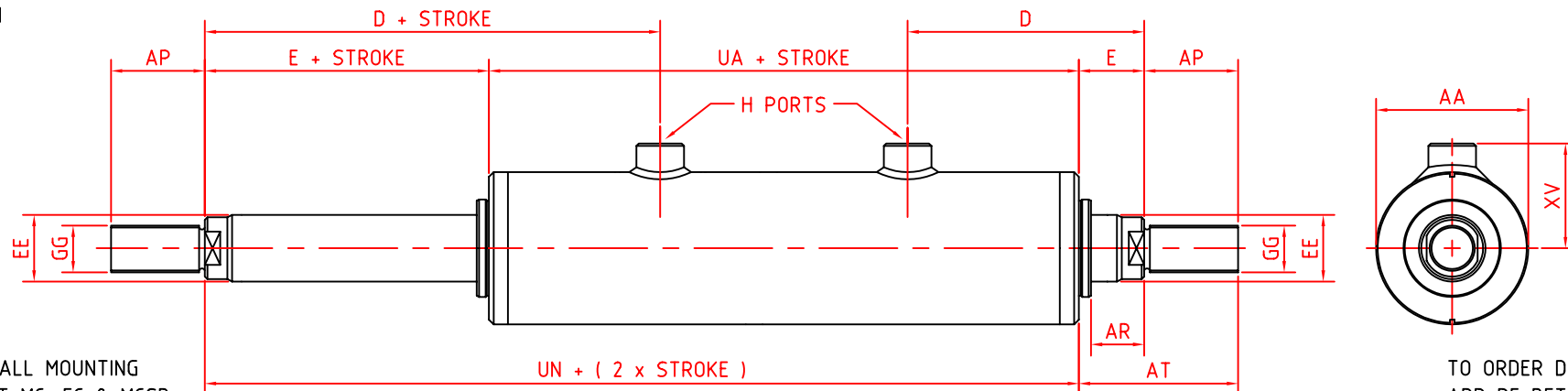
FIT FOR JOURNAL PP : USE BS 1916 C f8

CYLINDER SIZE	EE ROD	GG THREAD	A1	A2	A3	B1	B2	B3	E	D	AP	V	VH	AT	H BSPP	AA	XV	PP	XB	XC	XE	XL	WB	WE1
HR/HSB 15 1.50" BORE	0.875 22.22	3/4" - 16UN	5.875 149.23	6.375 161.93	7.25 184.15	2.375 60.33	3.375 85.73	4.25 107.95	0.875 22.22	3.125 79.37	1.125 28.57	1.25 31.75	0.75 19.05	2.00 50.80	3/8"	2.00 50.80	1.75 44.45	1.00 25.40	4.50 114.30	2.50 63.50	1.375 34.93	1.25 31.75	1.00 25.40	5.50 139.70
HR/HSB 20 2.00" BORE	1.00 25.40	3/4" - 16UN	5.875 149.23	6.375 161.93	7.375 187.33	2.875 73.03	3.75 95.25	4.75 120.65	0.875 22.22	2.75 69.85	1.125 28.57	1.125 28.57	0.75 19.05	2.00 50.80	3/8"	2.50 63.50	2.00 50.80	1.25 31.75	5.50 139.70	3.00 76.20	1.375 34.93	1.50 38.10	1.25 31.75	5.625 142.88
HR/HSB 25 2.50" BORE	1.375 34.92	1" - 14UN	6.375 161.93	6.875 174.63	7.875 200.03	3.125 79.38	4.00 101.60	5.00 127.00	1.125 28.58	3.125 79.37	1.625 41.28	1.25 31.75	0.875 22.22	2.75 69.85	1/2"	3.00 76.20	2.25 57.15	1.375 34.93	6.25 158.75	3.50 88.90	1.50 38.10	1.75 44.45	1.375 34.93	6.25 158.75
HR/HSB 30 3.00" BORE	1.75 44.45	1 1/4" - 12UN	8.125 206.38	8.125 206.38	9.625 244.48	4.00 101.60	4.50 114.30	6.00 152.40	1.25 31.75	4.00 101.60	2.00 50.80	1.375 34.92	0.875 22.22	3.25 82.55	1/2"	3.50 88.90	2.375 60.33	1.50 38.10	7.00 177.80	4.00 101.60	1.625 41.28	2.125 53.98	1.50 38.10	8.00 203.20
HR/HSB 35 3.50" BORE	1.75 44.45	1 1/4" - 12UN	8.625 219.08	8.375 212.73	10.00 254.00	4.125 104.78	4.75 120.65	6.375 161.93	1.25 31.75	4.00 101.60	2.00 50.80	1.75 44.45	0.875 22.22	3.25 82.55	3/4"	4.00 101.60	2.875 73.03	1.75 44.45	8.25 209.55	4.75 120.65	2.00 50.80	2.375 60.33	1.75 44.45	8.125 206.38
HR/HSB 40 4.00" BORE	2.00 50.80	1 1/2" - 12UN	9.375 238.13	8.875 225.43	10.625 269.88	4.375 111.13	4.875 138.83	6.625 168.28	1.375 34.92	4.50 114.30	2.25 57.15	1.875 47.63	0.875 22.22	3.625 92.08	3/4"	4.50 114.30	3.25 82.55	1.75 44.45	8.75 222.25	5.25 133.35	2.00 50.80	2.625 66.68	1.75 44.45	8.875 225.43
HR/HSB 45 4.50" BORE	2.00 50.80	1 1/2" - 12UN	10.125 257.18	9.625 244.48	11.375 288.93	4.75 120.65	5.625 142.88	7.375 187.33	1.375 34.92	4.50 114.30	2.25 57.15	2.25 57.15	0.875 22.22	3.625 92.08	3/4"	5.125 130.18	3.50 88.90	2.00 50.80	9.875 250.83	5.875 149.23	2.25 57.15	2.938 74.61	2.00 50.80	9.25 234.95
HR/HSB 50 5.00" BORE	2.50 63.50	1 3/8" - 12UN	10.625 269.88	10.625 269.88	12.625 320.68	5.00 127.00	5.875 149.23	7.875 200.03	1.50 38.10	4.875 123.83	3.00 76.20	2.25 57.15	1.375 34.93	4.50 114.30	1"	5.625 142.88	3.875 98.43	2.00 50.80	10.375 263.52	6.375 161.93	2.50 63.50	3.313 84.14	2.00 50.80	9.875 250.83
HR/HSB 55 5.50" BORE	2.50 63.50	1 3/8" - 12UN	11.25 285.75	11.375 288.93	13.25 336.55	5.50 139.70	6.50 165.10	8.375 212.73	1.50 38.10	5.00 127.00	3.00 76.20	2.25 57.15	1.375 34.93	4.50 114.30	1"	6.125 155.58	4.25 107.95	2.25 57.15	11.375 288.93	6.875 174.63	2.50 63.50	3.438 87.31	2.25 57.15	10.50 266.70
HR/HSB 60 6.00" BORE	3.00 76.20	2 1/4" - 12UN	12.00 304.80	12.00 304.80	14.00 355.60	5.875 149.22	7.00 177.80	9.00 228.60	1.50 38.10	5.125 130.18	3.50 88.90	2.50 63.50	1.375 34.93	5.00 127.00	1"	6.625 168.28	4.50 114.30	2.25 57.15	12.125 307.98	7.625 193.68	2.50 63.50	3.813 96.84	2.25 57.15	11.00 279.40
HR/HSB 65 6.50" BORE	3.00 76.20	2 1/4" - 12UN	12.125 307.98	12.25 311.15	14.125 358.78	5.875 149.22	7.125 180.98	9.00 228.60	1.50 38.10	5.25 133.25	3.50 88.90	2.50 63.50	1.375 34.93	5.00 127.00	1"	7.25 184.15	4.75 120.65	2.50 63.50	13.25 336.55	8.25 209.55	2.75 69.85	4.125 104.78	2.50 63.50	11.125 282.58
HR/HSB 70 7.00" BORE	3.50 88.90	2 1/2" - 12UN	14.50 368.30	15.00 381.00	17.75 450.85	7.25 184.15	8.50 215.90	11.25 228.75	1.50 38.10	6.00 152.40	3.50 88.90	2.75 69.85	2.00 50.80	5.00 127.00	1 1/4"	7.75 196.85	5.25 133.35	2.75 69.85	14.50 368.30	9.00 228.60	3.00 76.20	4.50 114.30	2.75 69.85	13.25 336.55
HR/HSB 75 7.50" BORE	3.50 88.90	2 1/2" - 12UN	15.00 381.00	15.50 393.70	18.25 463.55	7.00 177.80	8.50 215.90	11.25 228.75	1.50 38.10	6.50 165.10	3.50 88.90	3.00 76.20	2.00 50.80	5.00 127.00	1 1/4"	8.50 215.90	5.50 139.70	2.75 69.85	15.25 387.35	9.75 247.65	3.00 76.20	4.875 123.83	2.75 69.85	13.50 342.90
HR/HSB 80 8.00" BORE	4.00 101.60	3" - 12UN	16.125 409.58	16.375 415.93	19.25 488.95	7.875 200.03	9.125 10.125	12.00 304.80	1.50 38.10	6.50 165.10	4.00 101.60	3.25 82.55	2.25 57.15	5.50 139.70	1 1/4"	9.00 228.60	6.00 152.40	3.25 82.55	17.00 431.80	10.50 266.70	3.50 88.90	5.25 133.35	3.25 82.55	14.375 365.13
HR/HSB 90 9.00" BORE	4.50 114.30	3" - 12UN	17.375 441.33	17.875 454.03	20.375 517.53	8.50 215.90	10.125 257.18	12.625 320.68	1.50 38.10	7.00 177.80	4.00 101.60	3.375 85.73	2.25 57.15	5.50 139.70	1 1/4"	10.00 254.00	6.50 165.10	4.00 101.60	20.00 508.00	12.00 304.80	4.25 107.95	6.00 152.40	4.00 101.60	15.50 393.70
HR/HSB 100 10.00" BORE	5.00 127.00	3 3/4" - 12UN	18.125 460.38	18.50 469.90	21.00 533.40	8.625 219.08	10.25 260.35	12.75 323.85	1.50 38.10	7.50 190.50	4.375 111.13	3.50 88.90	2.25 57.15	5.875 149.22	1 1/4"	11.00 279.40	7.00 177.80	4.50 114.30	22.00 558.80	13.00 330.20	4.625 117.48	6.50 165.10	4.50 114.30	16.125 409.58

HR & HSH NON-CUSHIONED CYLINDERS

HR SHOWN

PAGE No.	24
DOUBLE ENDED	
STYLE	DE

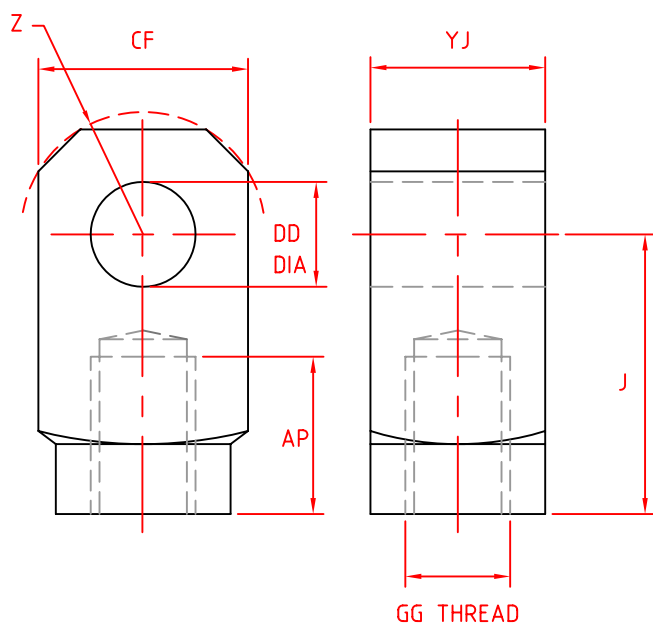


AVAILABLE IN ALL MOUNTING
STYLES EXCEPT MC, FC & MCSB
AND MOUNTING STYLE :

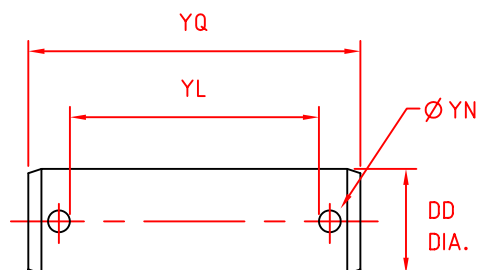
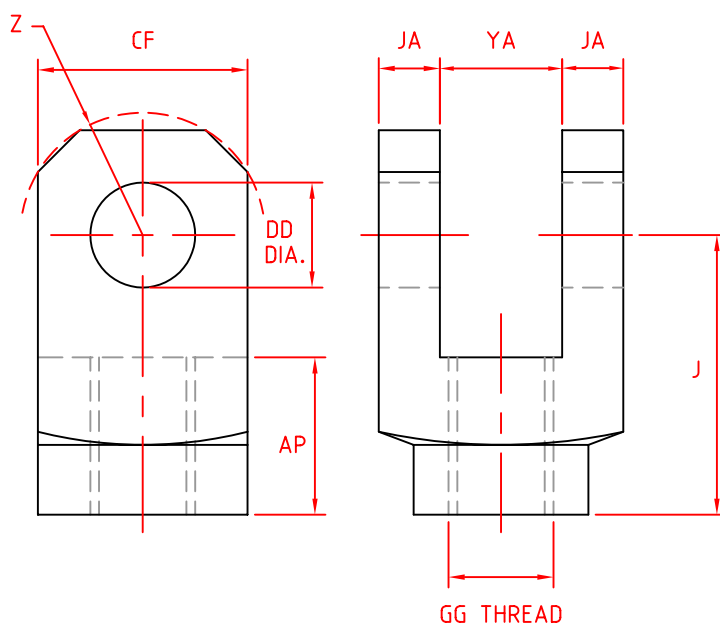
TO ORDER DOUBLE ENDED CYLINDERS
ADD DE BETWEEN THE BORE SIZE
AND MOUNTING STYLE :
EG :- HR20-DE-FF-2"

CYLINDER SIZE	EE ROD	GG THREAD	UA	UN	E	D	AP	AT	H BSPP	AA	XV	AR MIN	CYLINDER SIZE
HR/HS 15 1.50" BORE	0.875 22.22	3/4" - 16UN	6.875 174.63	7.75 169.85	0.875 22.22	3.125 79.37	1.125 28.57	2.00 50.80	3/8"	2.00 50.80	1.75 44.45	0.50 12.70	HR/HS 15 1.50" BORE
HR/HS 20 2.00" BORE	1.00 25.40	3/4" - 16UN	6.50 165.10	7.375 187.33	0.875 22.22	2.75 69.85	1.125 28.57	2.00 50.80	3/8"	2.50 63.50	2.00 50.80	0.50 12.70	HR/HS 20 2.00" BORE
HR/HS 25 2.50" BORE	1.375 34.92	1" - 14UN	7.25 184.15	8.375 212.73	1.125 28.58	3.125 79.37	1.625 41.28	2.75 69.85	1/2"	3.00 76.20	2.25 57.15	0.75 19.05	HR/HS 25 2.50" BORE
HR/HS 30 3.00" BORE	1.75 44.45	1 1/4" - 12UN	9.25 234.95	10.50 266.70	1.25 31.75	4.00 101.60	2.00 50.80	3.25 82.55	1/2"	3.50 88.90	2.375 60.33	0.875 22.22	HR/HS 30 3.00" BORE
HR/HS 35 3.50" BORE	1.75 44.45	1 1/4" - 12UN	9.25 234.95	10.50 266.70	1.25 31.75	4.00 101.60	2.00 50.80	3.25 82.55	3/4"	4.00 101.60	2.875 73.03	0.875 22.22	HR/HS 35 3.50" BORE
HR/HS 40 4.00" BORE	2.00 50.80	1 1/2" - 12UN	10.25 260.35	11.625 295.27	1.375 34.92	4.50 114.30	2.25 57.15	3.625 92.08	3/4"	4.50 114.30	3.25 82.55	0.875 22.22	HR/HS 40 4.00" BORE
HR/HS 45 4.50" BORE	2.00 50.80	1 1/2" - 12UN	10.625 269.87	12.00 304.60	1.375 34.92	4.50 114.30	2.25 57.15	3.625 92.08	3/4"	5.125 130.18	3.50 88.90	0.875 22.22	HR/HS 45 4.50" BORE
HR/HS 50 5.00" BORE	2.50 63.50	1 3/8" - 12UN	11.25 285.75	12.75 323.85	1.50 38.10	4.875 123.83	3.00 76.20	4.50 114.30	1"	5.625 142.88	3.875 98.43	1.00 25.40	HR/HS 50 5.00" BORE
HR/HS 55 5.50" BORE	2.50 63.50	1 3/8" - 12UN	12.125 307.98	13.625 346.07	1.50 38.10	5.00 127.00	3.00 76.20	4.50 114.30	1"	6.125 155.58	4.25 107.95	1.00 25.40	HR/HS 55 5.50" BORE
HR/HS 60 6.000" BORE	3.00 76.20	2 1/4" - 12UN	12.625 320.67	14.125 358.77	1.50 38.10	5.125 130.18	3.50 88.90	5.00 127.00	1"	6.625 168.28	4.50 114.30	1.00 25.40	HR/HS 60 6.000" BORE
HR/HS 65 6.50" BORE	3.00 76.20	2 1/4" - 12UN	13.00 330.20	14.50 368.30	1.50 38.10	5.25 133.25	3.50 88.90	5.00 127.00	1"	7.25 184.15	4.75 120.65	1.00 25.40	HR/HS 65 6.50" BORE
HR/HS 70 7.00" BORE	3.50 88.90	2 1/2" - 12UN	15.00 381.00	16.50 419.10	1.50 38.10	6.00 152.40	3.50 88.90	5.00 127.00	1 1/4"	7.75 196.85	5.25 133.35	1.00 25.40	HR/HS 70 7.00" BORE
HR/HS 75 7.50" BORE	3.50 88.90	2 1/2" - 12UN	15.75 400.05	17.25 438.15	1.50 38.10	6.50 165.10	3.50 88.90	5.00 127.00	1 1/4"	8.50 215.90	5.50 139.70	1.00 25.40	HR/HS 75 7.50" BORE
HR/HS 80 8.000" BORE	4.00 101.60	3" - 12UN	16.50 419.10	18.00 457.20	1.50 38.10	6.50 165.10	4.00 101.60	5.50 139.70	1 1/4"	9.00 228.60	6.00 152.40	1.00 25.40	HR/HS 80 8.000" BORE
HR/HS 90 9.00" BORE	4.50 114.30	3" - 12UN	18.00 457.20	19.50 495.30	1.50 38.10	7.00 177.80	4.00 101.60	5.50 139.70	1 1/4"	10.00 254.00	6.50 165.10	1.00 25.40	HR/HS 90 9.00" BORE
HR/HS 100 10.00" BORE	5.00 127.00	3 3/4" - 12UN	19.00 482.60	20.50 520.70	1.50 38.10	7.50 190.50	4.375 111.13	5.875 149.22	1 1/4"	11.00 279.40	7.00 177.80	1.00 25.40	HR/HS 100 10.00" BORE

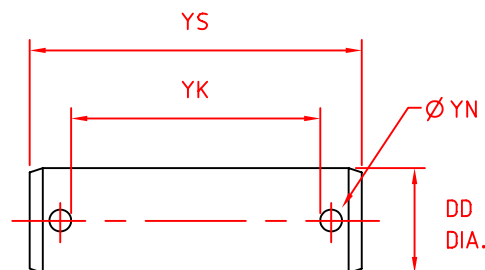
ROD KNUCKLE (RK)



ROD CLEVIS (RC)



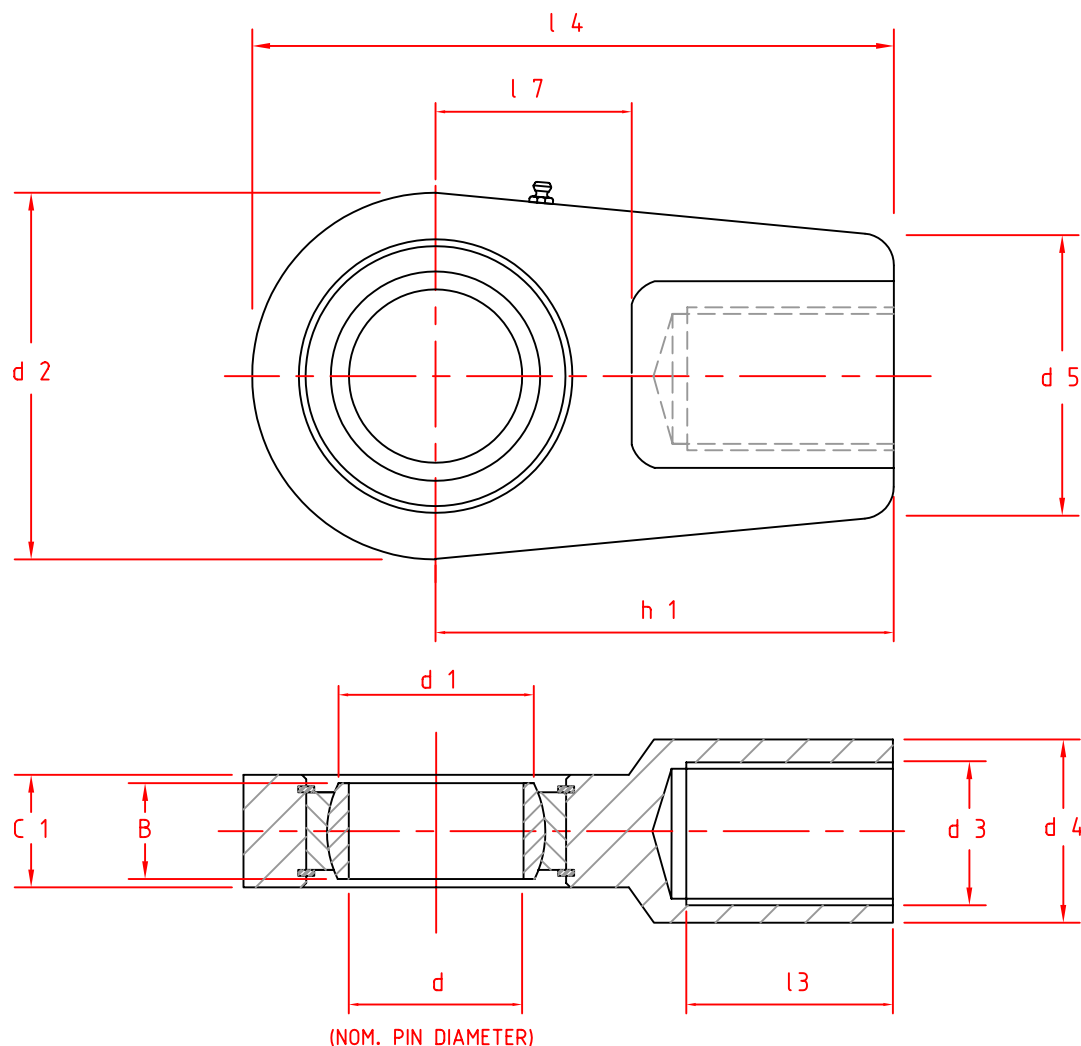
KNUCKLE PIN (KP)



CLEVIS PIN (CP)

CYLINDER SIZE	EE ROD	GG THREAD	AP	DD	J	CF	JA	YA	YJ	YL	YK	Z RAD	YS	YQ	YN
HR/HSR 15 1.50" BORE	0.875 22.22	3/4" - 16UN	1.125 28.57	0.50 12.70	1.875 47.63	1.00 25.40	0.375 9.53	0.875 22.22	1.00 25.40	1.75 44.45	1.625 41.27	0.50 12.70	2.25 57.15	2.375 60.33	7/64 2.78
HR/HSR 20 2.00" BORE	1.00 25.40	3/4" - 16UN	1.125 28.57	0.625 15.88	2.00 50.80	1.25 31.75	0.50 12.70	1.00 25.40	1.25 31.75	2.25 57.15	2.00 50.80	0.625 15.88	2.75 69.85	3.00 76.20	7/64 2.78
HR/HSR 25 2.50" BORE	1.375 34.92	1" - 14UN	1.625 41.28	0.75 19.05	2.75 69.85	1.50 38.10	0.562 14.27	1.125 28.57	1.50 38.10	2.625 66.68	2.25 57.15	0.75 19.05	3.00 76.20	3.375 85.73	7/64 2.78
HR/HSR 30 3.00" BORE	1.75 44.45	1 1/4" - 12UN	2.00 50.80	1.00 25.40	3.375 85.73	2.00 50.80	0.625 15.88	1.375 34.93	1.875 47.63	3.125 79.37	2.625 66.68	1.00 25.40	3.375 85.73	3.875 98.43	5/32 3.97
HR/HSR 35 3.50" BORE	1.75 44.45	1 1/4" - 12UN	2.00 50.80	1.00 25.40	3.375 85.73	2.00 50.80	0.625 15.88	1.375 34.93	1.875 47.63	3.125 79.37	2.625 66.68	1.00 25.40	3.375 85.73	3.875 98.43	5/32 3.97
HR/HSR 40 4.00" BORE	2.00 50.80	1 1/2" - 12UN	2.25 57.15	1.25 31.75	3.875 98.43	2.50 63.50	0.875 22.22	1.75 44.45	2.375 60.33	4.125 104.78	3.50 88.90	1.25 31.75	4.25 107.95	4.875 123.83	5/32 3.97
HR/HSR 45 4.50" BORE	2.00 50.80	1 1/2" - 12UN	2.25 57.15	1.25 31.75	3.875 98.43	2.50 63.50	0.875 22.22	1.75 44.45	2.375 60.33	4.125 104.78	3.50 88.90	1.25 31.75	4.25 107.95	4.875 123.83	5/32 3.97
HR/HSR 50 5.00" BORE	2.50 63.50	1 3/4" - 12UN	3.00 76.20	1.75 44.45	5.25 133.35	3.50 88.90	1.00 25.40	2.00 50.80	2.75 69.85	4.75 120.65	4.00 101.60	1.75 44.45	4.75 120.65	5.50 139.70	5/32 3.97
HR/HSR 55 5.50" BORE	2.50 63.50	1 3/4" - 12UN	3.00 76.20	1.75 44.45	5.25 133.35	3.50 88.90	1.00 25.40	2.00 50.80	2.75 69.85	4.75 120.65	4.00 101.60	1.75 44.45	4.75 120.65	5.50 139.70	5/32 3.97
HR/HSR 60 6.00" BORE	3.00 76.20	2 1/4" - 12UN	3.50 88.90	2.00 50.80	6.00 152.40	4.00 101.60	1.25 31.75	2.375 60.33	3.25 82.55	5.75 146.05	4.875 123.83	2.00 50.80	6.00 152.40	6.75 171.45	7/32 5.56
HR/HSR 65 6.50" BORE	3.00 76.20	2 1/4" - 12UN	3.50 88.90	2.00 50.80	6.00 152.40	4.00 101.60	1.25 31.75	2.375 60.33	3.25 82.55	5.75 146.06	4.875 123.83	2.00 50.80	6.00 152.40	6.75 171.45	7/32 5.56
HR/HSR 70 7.00" BORE	3.50 88.90	2 1/2" - 12UN	3.50 88.90	2.50 63.50	6.50 165.10	5.00 127.00	1.375 34.93	2.625 66.68	3.75 95.25	6.50 165.10	5.375 136.53	2.50 63.50	6.50 165.10	7.50 190.50	7/32 5.56
HR/HSR 75 7.50" BORE	3.50 88.90	2 1/2" - 12UN	3.50 88.90	2.50 63.50	6.50 165.10	5.00 127.00	1.375 34.93	2.625 66.68	3.75 95.25	6.50 165.10	5.375 136.53	2.50 63.50	6.50 165.10	7.50 190.50	7/32 5.56
HR/HSR 80 8.00" BORE	4.00 101.60	3" - 12UN	4.00 101.60	3.00 76.20	7.50 190.50	6.00 152.40	1.50 38.10	3.125 79.38	4.25 107.95	7.25 184.15	6.125 155.58	3.00 76.20	7.50 190.50	8.50 215.90	9/32 7.14
HR/HSR 90 9.00" BORE	4.50 114.30	3" - 12UN	4.00 101.60	3.50 88.90	8.00 203.20	7.00 177.80	2.00 50.80	4.00 101.60	4.50 114.30	8.50 215.90	8.00 203.20	3.50 88.90	9.50 241.30	9.75 247.65	9/32 7.14
HR/HSR 100 10.00" BORE	5.00 127.00	3 3/4" - 12UN	4.375 111.13	3.50 88.90	8.50 215.90	7.00 177.80	2.00 50.80	4.00 101.60	5.00 127.00	9.00 228.60	8.00 203.20	3.50 88.90	9.50 241.30	10.25 260.35	9/32 7.14

ROD KNUCKLE WITH SPHERICAL BEARING (RKSb)



CYLINDER SIZE	EE ROD	PART NUMBER	d3 THREAD	d	d 1	d 2	d 4	d 5	B	C 1	h 1	l 3	l 4	l 7
HR/HSb 15 1.50" BORE	0.875 22.22	RKSb20	M16x1.5	20mm	0.949 24.1	2.205 56.0	0.984 25.0	1.614 41.0	0.630 16.0	0.748 19.0	1.969 50.0	0.669 17.0	3.071 78.0	0.984 25.0
HR/HSb 20 2.00" BORE	1.00 25.40	RKSb20	M16x1.5	20mm	0.949 24.1	2.205 56.0	0.984 25.0	1.614 41.0	0.630 16.0	0.748 19.0	1.969 50.0	0.669 17.0	3.071 78.0	0.984 25.0
HR/HSb 25 2.50" BORE	1.375 34.92	RKSb25	M16x1.5	25mm	1.154 29.3	2.205 56.0	0.984 25.0	1.614 41.0	0.787 20.0	0.906 23.0	1.969 50.0	0.669 17.0	3.071 78.0	0.984 25.0
HR/HSb 30 3.00" BORE	1.75 44.45	RKSb30	M22x1.5	30mm	1.346 34.2	2.520 64.0	1.260 32.0	1.811 46.0	0.867 22.0	1.102 28.0	2.362 60.0	0.906 23.0	3.622 92.0	1.181 30.0
HR/HSb 35 3.50" BORE	1.75 44.45	RKSb30	M22x1.5	30mm	1.346 34.2	2.520 64.0	1.260 32.0	1.811 46.0	0.867 22.0	1.102 28.0	2.362 60.0	0.906 23.0	3.622 92.0	1.181 30.0
HR/HSb 40 4.00" BORE	2.00 50.80	RKSb35	M28x1.5	35mm	1.563 39.7	3.071 78.0	1.575 40.0	2.283 58.0	0.984 25.0	1.181 30.0	2.756 70.0	1.142 29.0	4.291 109.0	1.496 38.0
HR/HSb 45 4.50" BORE	2.00 50.80	RKSb35	M28x1.5	35mm	1.563 39.7	3.071 78.0	1.575 40.0	2.283 58.0	0.984 25.0	1.181 30.0	2.756 70.0	1.142 29.0	4.291 109.0	1.496 38.0
HR/HSb 50 5.00" BORE	2.50 63.50	RKSb40	M35x1.5	40mm	1.772 45.0	3.701 94.0	1.929 49.0	2.598 66.0	1.102 28.0	1.378 35.0	3.346 85.0	1.417 36.0	5.197 132.0	1.772 45.0
HR/HSb 55 5.50" BORE	2.50 63.50	RKSb40	M35x1.5	40mm	1.772 45.0	3.701 94.0	1.929 49.0	2.598 66.0	1.102 28.0	1.378 35.0	3.346 85.0	1.417 36.0	5.197 132.0	1.772 45.0
HR/HSb 60 6.00" BORE	3.00 76.20	RKSb50	M45x1.5	50mm	2.201 55.9	4.567 116.0	2.402 61.0	3.465 88.0	1.378 35.0	1.575 40.0	4.134 105.0	1.811 46.0	6.417 163.0	2.165 55.0
HR/HSb 65 6.50" BORE	3.00 76.20	RKSb50	M45x1.5	50mm	2.201 55.9	4.567 116.0	2.402 61.0	3.465 88.0	1.378 35.0	1.575 40.0	4.134 105.0	1.811 46.0	6.417 163.0	2.165 55.0
HR/HSb 70 7.00" BORE	3.50 88.90	RKSb60	M58x1.5	60mm	2.630 66.8	5.118 130.0	2.953 75.0	3.543 90.0	1.732 44.0	1.969 50.0	5.118 130.0	2.323 59.0	7.874 200.0	2.559 65.0
HR/HSb 75 7.50" BORE	3.50 88.90	RKSb60	M58x1.5	60mm	2.630 66.8	5.118 130.0	2.953 75.0	3.543 90.0	1.732 44.0	1.969 50.0	5.118 130.0	2.323 59.0	7.874 200.0	2.559 65.0
HR/HSb 80 8.00" BORE	4.00 101.60	RKSb80	M80x2.0	80mm	3.520 89.4	6.929 176.0	4.016 102.0	4.921 125.0	2.165 55.0	2.362 60.0	6.693 170.0	3.189 81.0	9.134 232.0	3.150 80.0
HR/HSb 90 9.00" BORE	4.50 114.30	RKSb100	M100x2.0	90mm	3.862 98.1	8.110 206.0	4.882 124.0	5.748 146.0	2.362 60.0	2.559 65.0	8.268 210.0	3.976 101.0	12.717 323.0	3.543 90.0
HR/HSb 100 10.00" BORE	5.00 127.00	RKSb100	M110x2.0	100mm	4.311 109.5	9.055 230.0	5.433 138.0	6.535 166.0	2.756 70.0	2.756 70.0	9.252 235.0	4.370 111.0	14.173 360.0	4.134 105.0

THEORETICAL PUSH AND PULL FORCES FOR HYDRAULIC CYLINDERS

DETERMINE FORCE REQUIRED—TO SELECT A CYLINDER FOR AN APPLICATION, FIRST DETERMINE THE MAXIMUM PUSH AND/OR PULL FORCE REQUIRED TO DO THE JOB. THEN USE THIS CHART TO SELECT THE CYLINDER THAT GIVES THE NECESSARY FORCE FOR YOUR APPLICATION. IT SHOULD BE NOTED THAT THE FORCE REQUIREMENTS DERIVED BY FORMULA ARE ONLY THEORETICALLY CORRECT. OTHER FORCES MUST BE PROVIDED FOR.

PRESSURE DROP - WHICH MEANS THAT WORKING PRESSURE AT THE CYLINDER PORT WILL BE SOMEWHAT LESS THAN SYSTEM PRESSURE - SHOULD BE ALLOWED FOR IN SUCH CALCULATIONS. A MARGIN FOR OVERCOMING FRICTION IN THE CYLINDER LIKEWISE MUST BE ADDED.

A CERTAIN AMOUNT OF THE FORCE THAT A CYLINDER CAN EXERT IS COUNTER ACTED BY THE FRICTION DEVELOPED THROUGH THE PACKING AND TO A LESSER EXTENT BY THE WEIGHT OF THE PISTON. THE AMOUNT REQUIRED TO COUNTER ACT THESE RESISTANCE'S HAS BEEN REDUCED IN THESE CYLINDERS TO LESS THAN 5% OF THE CYLINDERS THEORETICAL POWER.

BASIC HYDRAULIC CYLINDER FORMULA

THE CYLINDER OUTPUT FORCES ARE DERIVED FROM THE FORMULA.

$$F = P \times A$$

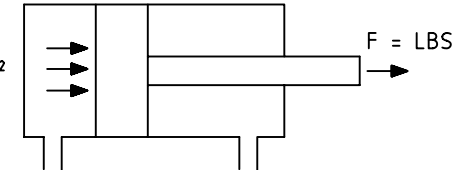
WHERE F = FORCE IN POUNDS

P = PRESSURE AT THE CYLINDER IN POUNDS PER SQUARE INCH

A = EFFECTIVE AREA OF CYLINDER PISTON IN SQUARE INCHES

$$P = \text{PSI}$$

$$A = \text{AREA IN}^2$$



BORE DIA.	ROD DIA.	CYL. WORK AREA SQ. IN.	WORKING PRESSURE P.S.I.					
			500	1000	1500	2000	2500	3000
1.50"		PUSH 1.77	885	1770	2655	3540	4425	5310
	0.875	PULL 1.17	585	1170	1755	2340	2925	3510
	1.00	PULL .98	490	980	1470	1960	2450	2940
2.00"		PUSH 3.14	1570	3140	4710	6280	7850	9420
	1.00	PULL 2.36	1180	2360	3540	4720	5900	7080
	1.375	PULL 1.66	830	1660	2490	3320	4150	4980
2.50"		PUSH 4.91	2455	4910	7365	9820	12275	14730
	1.375	PULL 3.42	1710	3420	5130	6840	8550	10260
	1.75	PULL 2.50	1250	2500	3750	5000	6250	7500
3.00"		PUSH 7.07	3535	7070	10605	14140	17675	21210
	1.75	PULL 4.66	2330	4660	6990	9320	11650	13980
	2.00	PULL 3.93	1965	3930	5895	7860	9825	11790
4.00"		PUSH 12.57	6285	12570	18855	25140	31425	37710
	2.00	PULL 9.42	4710	9420	14130	18840	23550	28260
	2.50	PULL 7.66	3830	7660	11490	15320	19150	22980
	3.00	PULL 5.50	2750	5500	8250	11000	13750	16500
		PUSH 15.90	7950	15900	23850	31800	39750	47700
4.50"	2.00	PULL 12.76	6380	12760	19140	25520	31900	38280
	2.50	PULL 11.00	5500	11000	16500	22000	27500	33000
	3.00	PULL 8.84	4420	8840	13260	17680	22100	26520
5.00"		PUSH 19.64	9820	19640	29460	39280	49100	58920
	2.50	PULL 14.73	7365	14730	22095	29460	36825	44190
	3.00	PULL 12.57	6285	12570	18855	25140	31425	37710
	3.50	PULL 10.01	4710	9420	14130	18840	23550	28260
	4.00	PULL 7.07	3535	7070	10605	14140	17675	21210
5.50"		PUSH 23.79	11895	23790	35685	47580	59475	71370
	2.50	PULL 18.88	9440	18880	28320	37760	47200	56640
	3.00	PULL 16.72	8360	16720	25080	33440	41800	50160
	3.50	PULL 14.16	7080	14160	21240	28320	35400	42480
	4.00	PULL 11.22	5610	11220	16830	22440	28050	33660
6.00"		PUSH 28.27	14135	28270	42405	56540	70675	84810
	3.00	PULL 21.21	10605	21210	31815	42420	53025	63630
	3.50	PULL 18.65	9325	18650	27975	37300	46625	55950
	4.00	PULL 15.71	7855	15710	23565	31420	39275	47130
	4.50	PULL 12.37	6185	12370	18555	24740	30925	37110
	5.00	PULL 8.64	4320	8640	12960	17280	21600	25920

BORE DIA.	ROD DIA.	CYL. WORK AREA SQ. IN.	WORKING PRESSURE P.S.I.					
			500	1000	1500	2000	2500	3000
6.50"		PUSH 33.18	16590	33180	49770	66360	82950	99540
	3.00	PULL 26.11	13055	26110	39165	52220	65275	78330
	3.50	PULL 23.56	11780	23560	35340	47120	58900	70680
	4.00	PULL 20.62	10310	20620	30930	41240	51550	61860
	4.50	PULL 17.28	8640	17280	25920	34560	43200	51840
7.00"	5.00	PULL 13.55	6775	13550	20325	27100	33875	40650
		PUSH 38.49	19245	38490	57735	76980	96225	115470
	3.50	PULL 28.86	14430	28860	43290	57720	72150	86580
	4.00	PULL 25.92	12960	25920	38880	51840	64800	77760
	4.50	PULL 22.58	11290	22580	33870	45160	56450	67740
7.50"	5.00	PULL 18.85	9425	18850	28275	37700	47125	56550
		PUSH 44.18	22090	44180	66270	88360	110450	132540
	3.50	PULL 34.56	17280	34560	51840	69120	86400	103680
	4.00	PULL 31.61	15805	31610	47415	63220	79025	94830
	4.50	PULL 28.28	14140	28280	42420	56560	70700	84840
8.00"	5.00	PULL 24.54	12270	24540	36810	49080	61350	73620
		PUSH 50.27	25135	50270	75405	100540	125675	150810
	4.00	PULL 37.70	18850	37700	56550	75400	94250	113100
	4.50	PULL 34.36	17180	34360	51540	68720	85900	103080
	5.00	PULL 30.63	15315	30630	45945	61260	76575	91890
9.00"	6.00	PULL 21.99	10995	21990	32985	43980	54975	65970
		PUSH 63.62	31810	63620	95430	127240	159050	190860
	4.50	PULL 47.71	23855	47710	71565	95420	119275	143130
	5.00	PULL 43.98	21990	43980	65970	87960	109950	131940
	5.50	PULL 39.86	19930	39860	59790	79720	99650	119580
10.00"	6.00	PULL 36.34	18175	36350	54525	72700	90875	109050
	7.00	PULL 25.13	12565	25130	37695	50260	62825	75390
		PUSH 78.54	39270	78540	117810	157080	196350	235620
	5.00	PULL 58.91	29455	58910	88365	117820	147275	176730
	5.50	PULL 54.78	27390	54780	82170	109560	136950	164340
10.00"	6.00	PULL 50.27	25135	50270	75405	100540	125675	150810
	7.00	PULL 40.06	20030	40060	60090	80120	100150	120180
	8.00	PULL 28.27	14135	28270	42405	56540	70675	84810

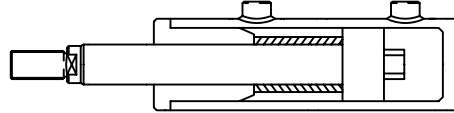
STOP TUBE AND PISTON ROD STROKE SELECTION

THE STOP TUBE IS A GENERALLY ACCEPTED AND PREFERRED METHOD OF REDUCING PISTON AND BEARING LOADS ON LONG PUSH STROKE CYLINDERS. IT MINIMIZES THE JACK-KNIFE EFFECT AND REDUCES BEARING PRESSURE.

AS ILLUSTRATED BELOW THE STOP TUBE IS PLACED BETWEEN THE PISTON AND THE CYLINDER GLAND TO RESTRICT THE EXTENDED POSITION OF THE ROD SO THAT THE LENGTHENED SPACE BETWEEN THE PISTON AND GLAND PROVIDES ADDITIONAL STRENGTH AND SIDE SUPPORT FOR THE EXTENDED ROD

STOP TUBES ARE NORMALLY USED FOR STROKES EXCEEDING 40 INCHES OR MORE. THE BASIC LENGTH OF THE CYLINDER IS INCREASED BY THE STOP TUBE LENGTH.

$$\text{STOP TUBE LENGTH (INCH)} = \frac{\text{STROKE (INCH)} - 40 \text{ (INCH)}}{10}$$



THE PISTON ROD IN A CYLINDER ACTS AS A COLUMN UNDER THRUST (PUSH) CONDITIONS. IT IS ,THEREFORE, SUBJECTED TO BOTH COMPRESSIVE STRESSES AND BUCKLING STRESSES. CONSEQUENTLY, IT MAY BE NECESSARY TO INCREASE THE ROD DIAMETER TO ACHIEVE THE NECESSARY COLUMN "STRENGTH".

THE VALUE OF "K" SHOWN IN THE TABLES ARE OUR RECOMMENDED MAXIMUM EQUIVALENT "K" LENGTH FOR NORMAL HORIZONTAL AND VERTICAL APPLICATIONS UNDER LIGHT TO MEDIUM SHOCK LOADS. FOR HEAVY DUTY SHOCK LOADING AND HIGH CYCLING, CHOOSE THE NEXT ROD SIZE LARGER THAN SHOWN BY THE TABLE.

PROCEDURE

1. DETERMINE ACTUAL LENGTH "L" FROM THE APPLICABLE DIAGRAM REMEMBERING TO ADD IN STOP TUBE AND ANY ADDITIONAL ROD EXTENSION
2. CALCULATE "K" FROM FORMULA ADJACENT TO EACH DIAGRAM GROUP.
3. DETERMINE CYLINDER THRUST FROM APPLICABLE FORMULA.
4. FIND ROD SIZE FROM TABLE BY READING ACROSS LINE FROM THE PUSH (LOAD) FIGURE UNTIL THE FIRST FIGURE EXCEEDING CALCULATED "K" IS REACHED. RECOMMENDED ROD DIAMETER IS THEN READ FROM THE TOP OF THE TABLE.
5. IF PISTON ROD EXCEEDS MAXIMUM ROD SIZE AVAILABLE IN CYLINDER BORE, THEN USE LARGER BORE CYLINDER AT REDUCED PRESSURE

MILLIMETRE

TABLE OF "K"

PUSH kN	ROD DIAMETER															
	16	25	35	44	51	64	76	89	102	114	127	140	152	178		
1	1300															
2	920	2300														
2.5	820	2050	3920													
3	750	1870	3540													
4	650	1620	3070	5000	6450											
5	580	1450	2740	4500	5800											
6	530	1320	2500	4100	5300											
8	460	1140	2160	3500	4600	7100										
10	410	1020	1930	3150	4100	6400										
12	380	940	1760	2900	3750	5850										
14	350	870	1630	2670	3450	5400										
18	310	770	1440	2350	3050	4750	6870									
22	280	690	1300	2130	2750	4300	6200	8500								
26		640	1190	1950	2550	3950	5700	7850								
30		590	1120	1820	2350	3700	5300	7300								
35		550	1020	1680	2200	3400	4900	6700	8800							
40		510	960	1570	2050	3200	4600	6300	8200							
45		480	910	1480	1930	3000	4350	5900	7700	9700	12100					
50		460	860	1400	1830	2850	4100	5600	7320	9250	11200					
60			790	1280	1670	2600	3750	5100	6650	8400	10200					
80			680	1120	1450	2250	3250	4420	5790	7300	9100	11000				
100			610	990	1300	2000	2900	4000	5150	6550	8100	10000	11800	15800		
150				810	1060	1630	2360	3230	4200	5300	6610	8100	9650	12800		
200					910	1420	2050	2800	3660	4600	5750	7000	8350	11200		
250						1260	1820	2500	3250	4120	5150	6250	7450	10000		
300							1660	2280	2950	3760	4700	5700	6800	9100		
350							1540	2100	2760	3500	4350	5300	6300	8400		
400							1440	1970	2600	3260	4080	4930	5650	7800		
500							1750	2310	2920	3620	4400	5250	7000			
750								1880	2370	2970	3600	4250	5650			
1000									2050	2570	3110	3700	4880			
1250										2310	2790	3300	4370			
1500										2200	2550	3020	4000			
1750											2350	2800	3700			
2000												2600	3450			

THIS AREA OVER
MAX. THRUST ABILITY
OF PISTON ROD

INCH

TABLE OF "K"

PUSH lb.f	ROD DIAMETER															
	5/8	1	1 3/8	1 3/4	2	2 1/2	3	3 1/2	4	4 1/2	5	5 1/2	6	7		
200	54															
500	34	86	165													
600	31	78	150													
800	27	67	129	207	270											
1000	24	60	115	185	241											
1200	22	55	105	170	221											
1400	20	51	97	156	205											
1600	19	48	90	146	192											
1800	18	45	85	138	181	280										
2000	17	43	80	131	171	267										
2500	15	38	72	117	153	238										
3000	14	35	65	107	140	218										
4000	12	30	57	93	121	189	272									
5000	11	27	50	83	108	172	243	330								
6000		25	46	76	99	154	221	301								
7000		23	42	70	91	143	205	280								
8000		21	39	66	85	134	192	262	342							
9000		20	37	62	80	126	181	246	323							
10000		19	35	59	76	119	171	234	307	386						
12000		17	32	54	70	109	156	212	279	351	435					
16000			27	47	60	94	135	184	241	305	375					
20000			24	42	54	84	122	165	216	272	336	405				
30000				34	44	69	99	134	176	222	274	330	390			
40000				29	38	60	86	116	152	193	238	286	337			
50000				34	54	77	103	136	172	212	256	300	405			
60000					49	70	94	124	157	193	233	250	370			
80000						61	82	107	136	167	202	278	320			
100000							55	73	96	122	150	181	228	285		
125000								66	86	109	134	162	192	255		
150000								60	78	99	123	148	175	234		
200000									68	86	106	127	152	202		
250000										77	94	114	146	180		
300000											86	104	124	165		
350000												96	115	152		
400000													90	107	142	

THIS AREA OVER
MAX. THRUST ABILITY
OF PISTON ROD

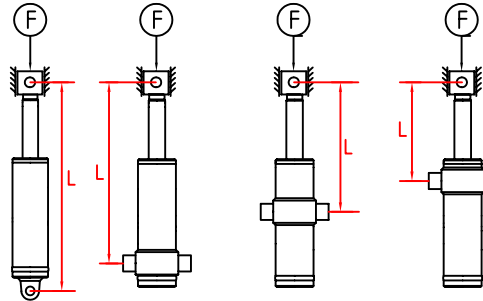
PISTON ROD BUCKLING LOAD EXAMPLES

INSTALLATION SITUATION OF CYLINDERS

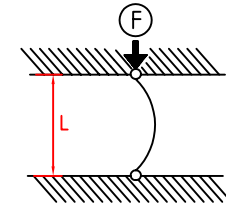
FREE BUCKLING LENGTH (K)

SITUATION 1

BOTH ENDS PIVOTED AND GUIDED (ROUND)

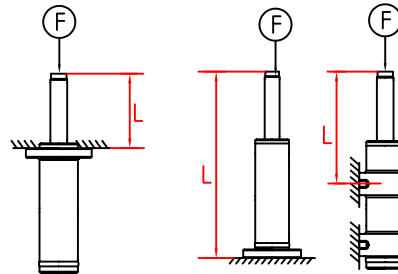


$$K = L$$

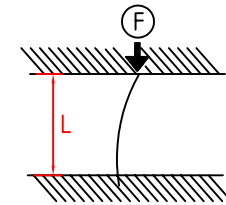


SITUATION 2

ONE END FIXED AND ONE END FREE.

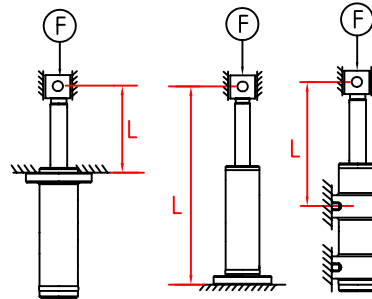


$$K = 2L$$

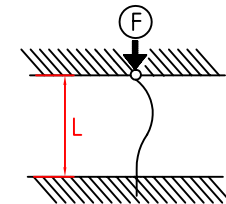


SITUATION 3

ONE END GUIDED AND PIVOTED AND ONE END FIXED

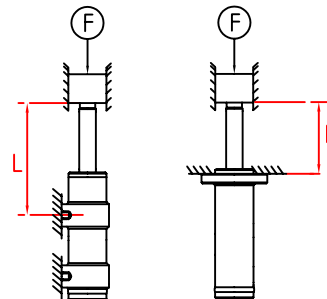


$$K = L \times \sqrt{\frac{1}{2}}$$

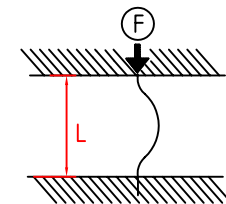


SITUATION 4

BOTH ENDS FIXED AND GUIDED



$$K = \frac{L}{2}$$



HANDLING OF HYDRAULIC CYLINDERS

- CARE SHOULD BE TAKEN AT ALL TIMES TO PREVENT DAMAGE TO CYLINDER OR INJURY TO PERSONNEL.
- WHENEVER POSSIBLE MAKE SURE THAT THE CYLINDER IS IN FULLY RETRACTED POSITION AND THAT THE PISTON IS RESTRAINED FROM EXTENDING BY GRAVITY OR OTHER MEANS.
- AVOID THE USE OF CHAINS WRAPPED AROUND THE CYLINDER AS THESE CAN SLIP AND CAUSE CONSIDERABLE DAMAGE, ESPECIALLY TO THE PISTON ROD.

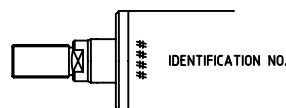
STORAGE OF HYDRAULIC CYLINDERS

WHEN STORAGE PERIODS ARE REQUIRED THE FOLLOWING PROCEDURES ARE RECOMMENDED :

- THE CYLINDER MUST BE STORED INDOORS IN A DRY AND NON-CORROSIVE ENVIRONMENT.
- PROTECTION PLUGS FITTED TO PORTS MUST BE LEFT ON AT ALL TIMES.
- PROTECT THE CYLINDER FROM INTERNAL CORROSION AND EXTERNAL CORROSION. IT IS RECOMMENDED THE CYLINDER BE FILLED WITH OPERATING FLUID.
- STORAGE IN A VERTICAL POSITION IS RECOMMENDED WITH THE PISTON ROD FACING UPWARDS. THIS WILL MINIMIZE STATIC SIDE LOADS ON THE SEALS AND CORROSION DUE TO POSSIBLE CONDENSATION IF THE CYLINDER IS NOT FILLED.
- IF VERTICAL STORAGE IS NOT POSSIBLE THEN THE CYLINDER CAN BE STORED HORIZONTALLY. HOWEVER FOR LONG PERIODS OF STORAGE THE CYLINDER MUST BE FILLED WITH THE WORKING FLUID AND ROTATION OF THE CYLINDER ON A FORTNIGHTLY BASIS IS RECOMMENDED.

IDENTIFICATION

- IN ALL CASES IDENTIFICATION OF THE CYLINDER IS STAMPED ON THE FRONT END, AS ILLUSTRATED. IN THE CASE THE CYLINDER IS SPECIAL THE IDENTIFICATION IS THE DRAWING NUMBER (H/L00####).



CYLINDER INSTALLATION

- ALL CYLINDERS ARE INDIVIDUALLY TESTED BEFORE SHIPMENT TO ASSURE FREEDOM FROM DEFECTS. IT IS RECOMMENDED THAT THE SHIPPING PLUGS IN THE CYLINDER PORTS NOT BE REMOVED DURING INSTALLATION UNTIL ACTUAL PIPING CONNECTIONS ARE TO BE MADE.

CYLINDER MOUNTING

- ALIGN THE CYLINDER CAREFULLY KEEPING MOUNTING SURFACES SQUARE, PARALLEL, CONCENTRIC AND TRUE (AS APPLICABLE) WITH THE WORK DIRECTION.
- TRUNNION AND PIVOT MOUNTED CYLINDERS SWIVEL IN ONE DIRECTION ONLY WITH TRUNNION PINS AND PIVOT PINS DESIGNED TO CARRY SHEAR LOADS ONLY. TRUNNION AND PIVOT BEARINGS MUST FIT CLOSELY FOR THE ENTIRE LENGTH OF THE PIN WITH TRUNNION BEARINGS HELD RIGIDLY AND IN ACCURATE ALIGNMENT.
- FLUSH MOUNTED CYLINDERS (TAPPED & LUG MOUNT) SHOULD BE PINNED OR KEYED TO PREVENT SHIFTING FROM LOAD APPLICATION.
- PIPE CONNECTIONS : ALL CONNECTING PIPES ENDS SHOULD BE DE-BURRED AND INSIDE SHOULD BE CLEANED OF SCALE, RUST AND DIRT. REMOVE SHIPPING PLUGS AND MAKE PROPER PIPE CONNECTION.
- CYLINDER OPERATION : OPERATE THE CYLINDER SEVERAL TIMES TO MAKE SURE IT IS FUNCTIONING PROPERLY. CHECK FOR LEAKS.

CUSHION ADJUSTMENT

- CUSHIONED CYLINDERS ARE ADJUSTED AND TESTED AT THE FACTORY, BUT MAY REQUIRE ADDITIONAL ADJUSTMENT AFTER CONNECTION TO THE WORK LOAD. TO INCREASE THE EFFECTIVENESS OF THE REAR CUSHION ONLY (FRONT CUSHIONS ARE NON-ADJUSTABLE) TURN THE ADJUSTING SCREW CLOCKWISE TO OBTAIN DESIRED CUSHIONING ACTION. TO DECREASE CUSHIONING ACTION, TURN ADJUSTING SCREW COUNTER-CLOCKWISE.

NOTE : IF INSTALLATION IS COMPLETE AND CYLINDER DOES NOT FUNCTION PROPERLY, CHECK THE FOLLOWING.

- (1) POOR ADJUSTMENT OF THE CYLINDER WITH ITS MATING PIECES.
- (2) INSUFFICIENT PRESSURE OR LEAKAGE.

CUSHION ADJUSTMENT

- CLEAN FLUID IS ESSENTIAL TO PROLONG THE SATISFACTORY OPERATION OF HYDRAULIC EQUIPMENT. KEEP OIL TANKS COVERED AND PROVIDE AN ADEQUATE FILTER.
- WITH A VERY MINOR AMOUNT OF ATTENTION AND UNDER ORDINARY CONDITIONS HYDROIL CYLINDER WILL EFFICIENTLY OPERATE FOR AT LEAST AS LONG A PERIOD AS IS GENERALLY REQUIRED OF THE EQUIPMENT OF WHICH IT IS A PART.
- SEAL REPLACEMENTS MAY BE REQUIRED AT INTERVALS ACCORDING TO THE MANNER IN WHICH THEY ARE USED.