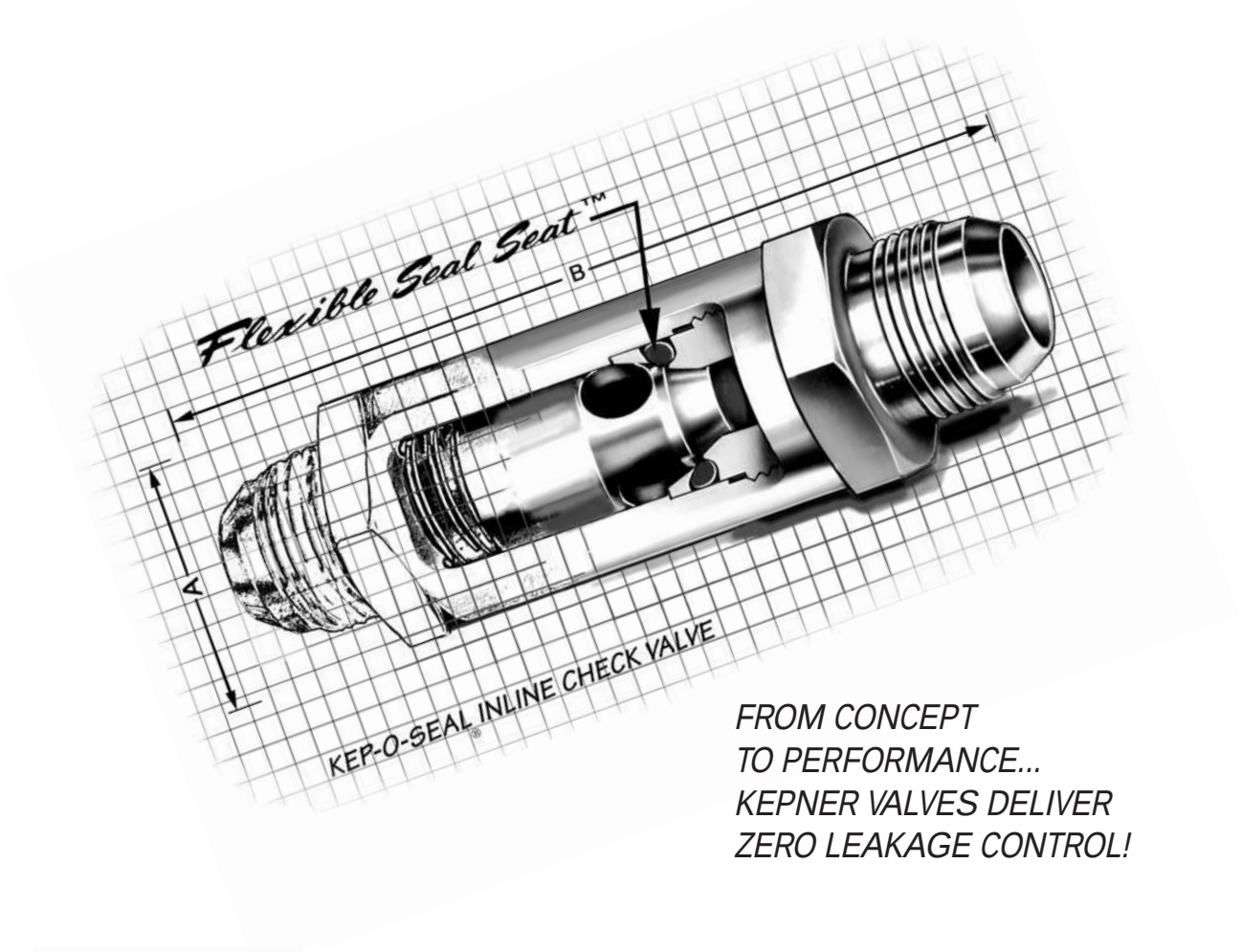
KEPNER
PRODUCTS COMPANY

2010 TECHNICAL CATALOG



FROM CONCEPT
TO PERFORMANCE...
KEPNER VALVES DELIVER
ZERO LEAKAGE CONTROL!

Kep-O-Seal® Kepsel® Kep-O-Lor®

Hydraulic and Pneumatic In-line and Cartridge Insert Control Valves for any fluid or gas.

Kepner Products Company: 995 North Ellsworth Avenue, Villa Park, Illinois 60181
630-279-1550 FAX 630-279-9669
www.kepner.com

More than 60 years in business and continuous improvement are your assurance of the best in product performance.

RELIABILITY SINCE 1948 We've been designing and producing control valves that out-deliver and outlast the competition. Our secret? Simple; we focus on basic concepts to provide the best check valves in the industry. You face a myriad of design challenges in your product. Specify the check valve you can rely on.

QUALITY...EVERY TIME Kepner valves are engineered and manufactured to the highest possible standards, ensuring they work when you need them to and for years to come.

AVAILABILITY We don't just have the best products. We utilize manufacturing and scheduling techniques to provide them when you need them. Our customer support... staffed by personnel with many years of experience...is there to provide assistance and answer questions quickly.

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Products and General Information

Kep-O-Seal® Inline Valves

- Check and Relief Check Valves
- Adjustable Relief Valves
- High Pressure Check/Relief Check Valves
- Ball Check Valves
- Shuttle Valves
- Fixed Orifice Flow Restrictor Valves
- Split Flange Check Valves

Kepsel® Cartridge Type Insert Versions

- Cartridge Check and Relief Check Valves
- Cartridge Adjustable Relief Valves
- Cartridge Shuttle Valves
- Cartridge Lock Valves
- Pneumatic Cartridge Lock Valves

Kep-O-Lok® Lock Valves

- Single Lock Valves
- Pneumatic Single Lock Valves
- Dual Lock Valves

- O-Ring Specification Guide
- Application and Product Suitability
- Material Selection and Safety
- Flow Coefficients
- Approximate Valve Weights
- Standard Terms and Conditions of Sale
- Web Site Information

★ **Technical Catalog Supplement - Tips and Applications**

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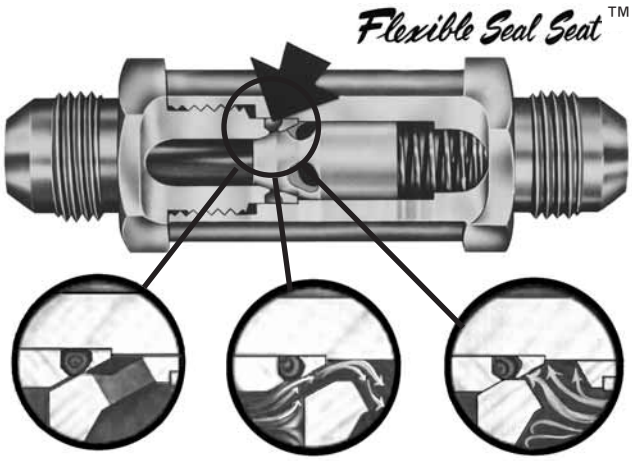
Our unique *Flexible Seal Seat*™ assures bubble-tight performance.

The Kepner ***Flexible Seal Seat***™ design offers positive leakage control of liquid or gas. The seat design is a carefully engineered combination of metal-to-metal and resilient O-Ring seal contact. The O-Ring is securely retained at the seat rather than on the poppet, protecting it from the destructive abrading and blasting effect of the flow; seal life is extended. Seat "wire drawing" common to conventional valves has been eliminated by the ***Flexible Seal Seat***™ design. The seal closes around scratches, dents, and other irregularities and effectively prevents any leakage past the seat. A wide choice of O-Ring seal elastomers is offered for system compatibility. The ***Flexible Seal Seat***™ design is available in check, relief, shuttle, and pilot operated check valves, and has been successfully applied to millions of fluid control situations.



CLOSED No Flow | **OPEN** Full Flow | **CLOSED** Reverse Flow Checked

CLOSED: (No Flow) Relaxed O-Ring seal and gentle seal-to-poppet contact guarantees low pressure sealing and eliminates valve chatter.

OPEN: (Full Flow) Seal flexes to close off all external leakage around end cap. Enclosure protects O-Ring seal, prevents seal displacement.

CLOSED: (Reverse Checked) Seal still holding external leakage now also flexes around poppet. Higher pressures tighten the seal. Bubble-tight shutoff.

- **LEAK TIGHT SEALING**
- **POSITIVE ACTION EVEN AT LOW PRESSURE**
- **FREEDOM FROM CHATTER**

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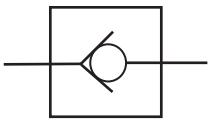
KEPNER PRODUCTS COMPANY

Inline Check and Relief Check Valves



These spring-operated poppet valves, with optional relief settings, allow free flow in only one direction and prevent backflow - sometimes referred to as "backflow preventor", "flow stop", or "non-return" valve. They are also used for relief and bypass functions.

Kepner's *Flexible Seal Seat* ™ combines metal-to-metal contact with a resilient seal seat ensuring dependable bubble-tight shutoff of liquid or gas, and long service life. Standard and specialty valve designs handle a wide variety of applications.

Features and Benefits:

- *Flexible Seal Seat*™ for zero leakage (bubble-tight) sealing at low and high pressures.
- O-Ring seal positively secured.
- Non-pressurized threads.
- Poppet stop inside valve body prevents spring from bottoming out.
- Generous flow passages allow full flow with minimal pressure drop.

Valve Specifications:

- Port Configurations: Pipe or Tube (NPT, JIC; 12 Combinations)
- Port Sizes: 1/8 inch to 3 inch (3.2 mm to 76 mm)
- Body Materials: Aluminum, Brass, Steel, 303 or 316 Stainless Steel
- O-Ring Seals: Buna-N, Neoprene, Teflon®, Viton®, EP, others available
- Temperature: -300°F to 450°F (-184°C to 232°C), O-Ring dependent
- Check Crack Pressure: 1 - 2 PSI (.07 bar to .14 bar)
- Relief/Check Crack Pressures: 5 PSI (.35 bar), 10 PSI (0.7 bar), 25 PSI (1.7 bar), 50 PSI (3.5 bar) and 65 PSI (4.5 bar), others available
- Operating Pressure: to 3,000 PSI (207 bar)
- Flow: to 500 GPM (1893 LPM)

Consult Factory or Distributor for more help. Customer/user is solely responsible to select products suitable for their specific application requirements and to ensure proper installation, operation and maintenance of these products. Improper selection or use of products can cause personal injury or property damage. All sales are subject to Kepner Products Company Standard Terms and Conditions of Sale. Design subject to change without notice.

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KEPNER PRODUCTS COMPANY

Inline Check and Relief Check Valves

Part Numbers: Fixed Settings 1/8" to 3" sizes

PORT CONFIGURATIONS

19 IJIC - IJIC	IJIC TUBE TO TUBE	**7** JIC - MPT	JIC TUBE TO PIPE
17 JIC - IJIC	JIC TUBE TO TUBE	**5** MPT - JIC	MPT PIPE TO TUBE
15 IJIC - JIC	IJIC TUBE TO TUBE	**4** FPT - FPT	FPT PIPE TO PIPE
13 JIC - JIC	JIC TUBE TO TUBE	**3** MPT - MPT	MPT PIPE TO PIPE
11 JIC - FPT	JIC TUBE TO PIPE	**2** FPT - MPT	FPT PIPE TO PIPE
9 FPT - JIC	FPT PIPE TO TUBE	**1** MPT - FPT	MPT PIPE TO PIPE

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PART NUMBER EXAMPLE

4 06 C - 1 - 25

PORT SIZES

04 = 1/8 PIPE - 1/4 TUBE	16 = 1" PIPE - 1" TUBE
06 = 1/4 PIPE - 3/8 TUBE	20 = 1 1/4 PIPE - 1 1/4 TUBE
08 = 3/8 PIPE - 1/2 TUBE	24 = 1 1/2 PIPE - 1 1/2 TUBE
10 = 1/2 PIPE - 5/8 TUBE	32 = 2" PIPE - 2" TUBE
12 = 3/4 PIPE - 3/4 TUBE	48 = 3" PIPE (CONSULT FACTORY)

CONSTRUCTION MATERIALS

A = ALUMINUM	D = 303 STAINLESS STEEL
B = BRASS	F = 316 STAINLESS STEEL
C = STEEL	

CRACK PRESSURE

"Blank"= 1-2 PSI CRACK (Standard)
5 = 5 PSI CRACK
10 = 10 PSI CRACK
25 = 25 PSI CRACK
50 = 50 PSI CRACK
65 = 65 PSI CRACK
OTHERS AVAILABLE

O-RING SEALS

1 = BUNA-N
3* = TEFLON®
9 = NEOPRENE
18 = VITON®
25 = ETHYLENE PROPYLENE
OTHERS AVAILABLE

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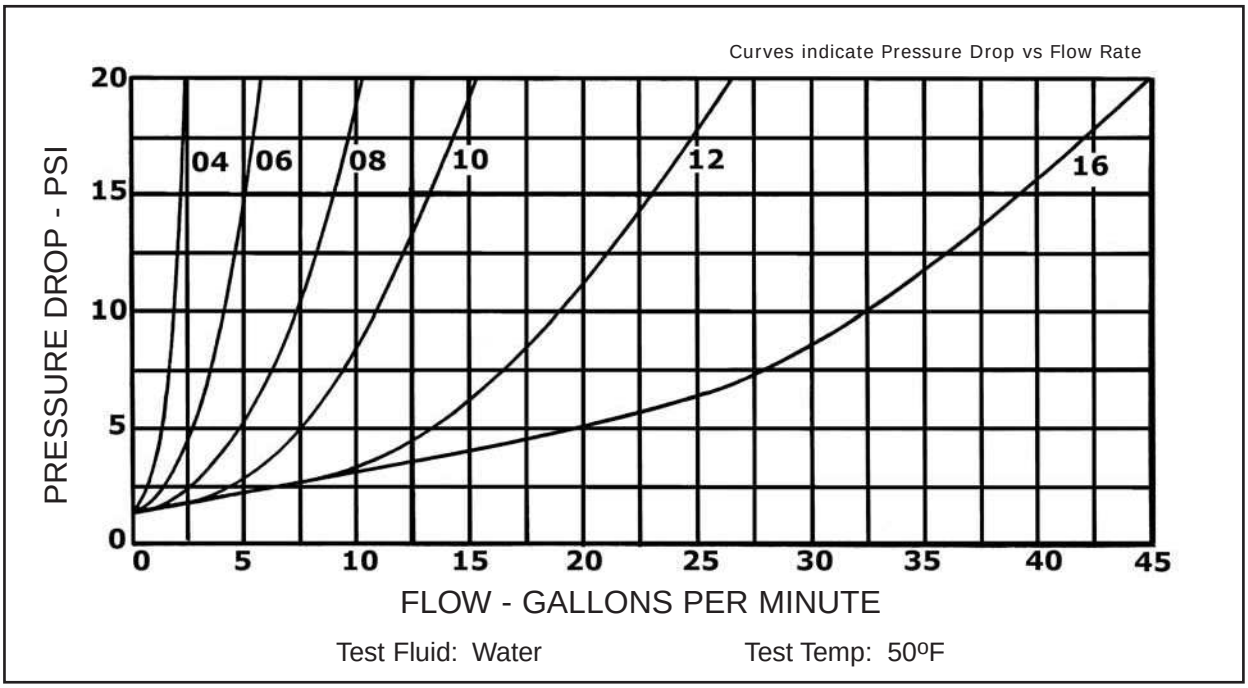
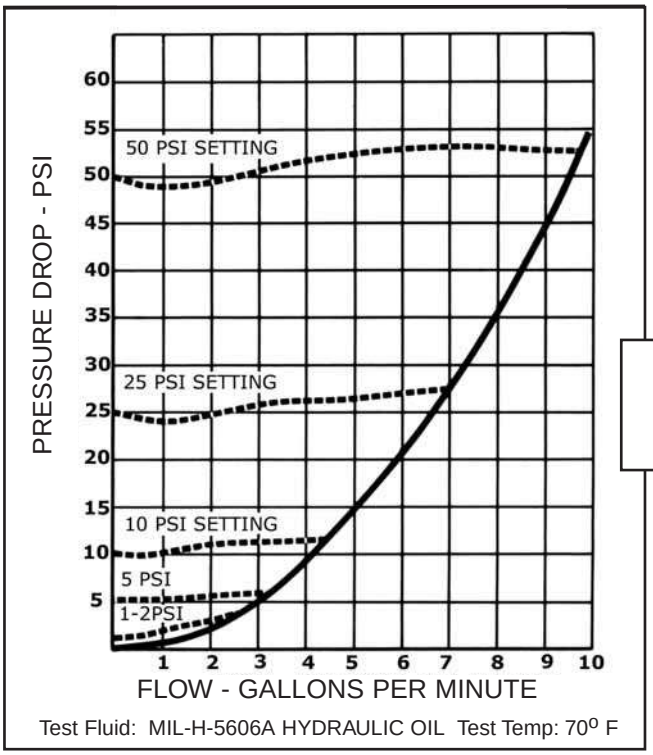
Flow Charts: Sizes 1/8" - 1"





SIZE	CONNECTIONS
04	1/8" Pipe or 1/4" Tube
06	1/4" Pipe or 3/8" Tube
08	3/8" Pipe or 1/2" Tube
10	1/2" Pipe or 5/8" Tube
12	3/4" Pipe or 3/4" Tube
16	1" Pipe or 1" Tube

EXAMPLE WITH VARIOUS RELIEF SETTINGS

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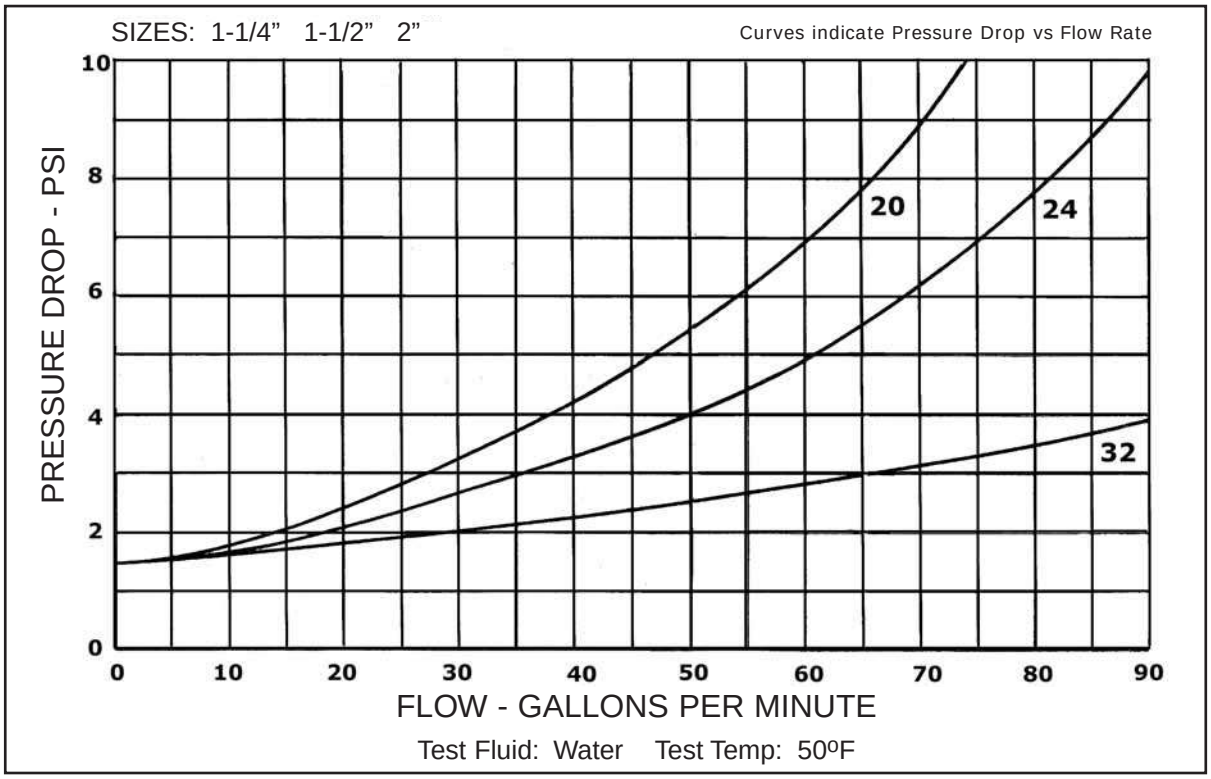
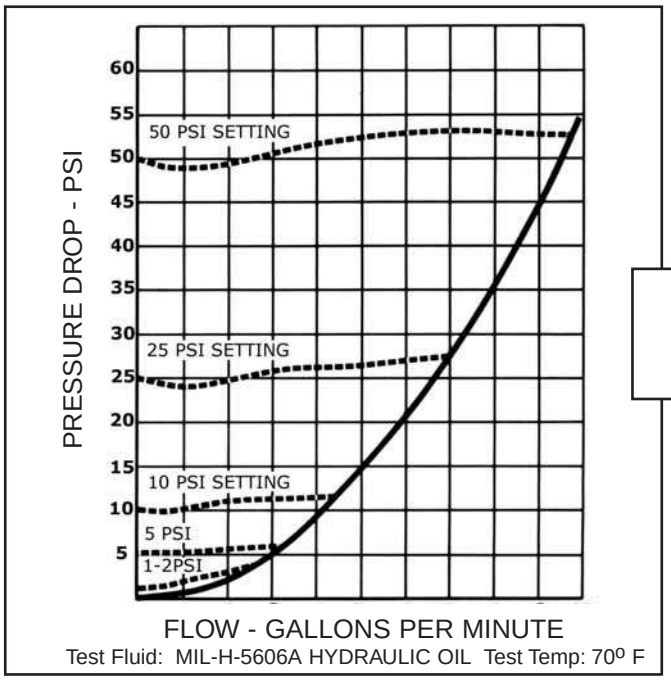
KEPNER PRODUCTS COMPANY

Inline Check and Relief Check Valves

Flow Charts: Sizes $1\frac{1}{4}$" - 2"





SIZE	CONNECTIONS
20	1-1/4" Pipe or Tube
24	1-1/2" Pipe or Tube
32	2" Pipe or Tube

EXAMPLE WITH VARIOUS RELIEF SETTINGS

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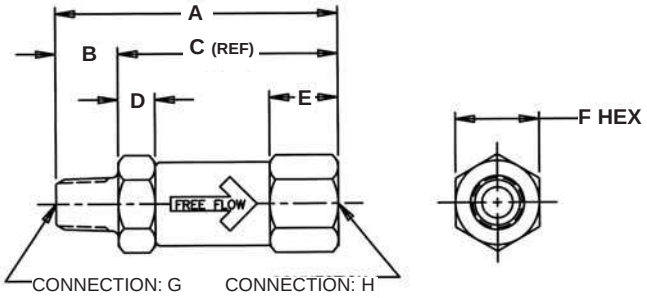
Inline Check and Relief Check Valves

Dimensions: Model 100

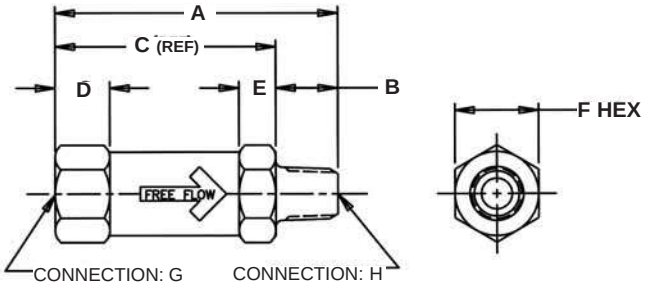
MODEL	A	B	C (REF)	D	E	F HEX.	G MPT	H FPT
104	2.27	.40	1.87	.20	.56	11/16	1/8	1/8
106	3.01	.60	2.41	.28	.97	13/16	1/4	1/4
108	3.19	.61	2.58	.30	.72	1	3/8	3/8
110	3.88	.79	3.09	.34	1.03	1 1/8	1/2	1/2
112	4.34	.80	3.54	.41	1.19	1 7/16 (1)	3/4	3/4
116	5.18	1.00	4.18	.53	1.31	1 13/16 (2)	1	1
120	6.14	.97	5.17	.73	1.59	2 5/8 (3)	1 1/4	1 1/4
124	6.17	1.00	5.17	.73	1.59	2 5/8 (3)	1 1/2	1 1/2
132	7.72	1.03	6.69	.94	2.00	3 1/2	2	2



NOTES BELOW REFER TO COLUMN "F"
(1) 1 1/2 FOR 316 STAINLESS STEEL
(2) 1 7/8 FOR 303 & 316 STAINLESS STEEL
(3) 2 3/4 FOR COMMERCIAL BRASS

Model 200

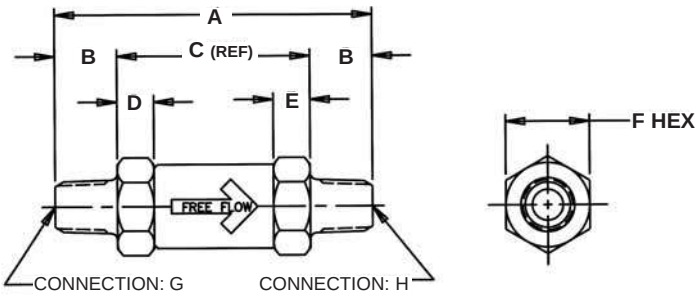
MODEL	A	B	C (REF)	D	E	F HEX.	G FPT	H MPT
204	2.00	.40	1.60	.27	.23	11/16	1/8	1/8
206	2.64	.60	2.04	.53	.35	13/16	1/4	1/4
208	2.84	.61	2.23	.30	.38	1	3/8	3/8
210	3.33	.79	2.54	.44	.38	1 1/8	1/2	1/2
212	3.75	.81	2.95	.56	.44	1 7/16 (1)	3/4	3/4
216	4.47	1.00	3.47	.53	.60	1 13/16 (2)	1	1
220	5.42	.97	4.45	.73	.88	2 5/8 (3)	1 1/4	1 1/4
224	5.47	1.00	4.47	.75	.88	2 5/8 (3)	1 1/2	1 1/2
232	6.91	1.03	5.88	.94	1.19	3 1/2	2	2



NOTES BELOW REFER TO COLUMN "F"
(1) 1 1/2 FOR 316 STAINLESS STEEL
(2) 1 7/8 FOR 303 & 316 STAINLESS STEEL
(3) 2 3/4 FOR COMMERCIAL BRASS

Model 300

MODEL	A	B	C (REF)	D	E	F HEX.	G MPT	H MPT
304	2.34	.40	1.54	.20	.22	11/16	1/8	1/8
306	2.99	.60	1.79	.28	.35	13/16	1/4	1/4
308	3.45	.61	2.23	.30	.38	1	3/8	3/8
310	4.02	.79	2.44	.34	.38	1 1/8	1/2	1/2
312	4.40	.80	2.80	.41	.44	1 7/16 (1)	3/4	3/4
316	5.46	1.00	3.46	.53	.60	1 13/16 (2)	1	1
320	6.39	.97	4.45	.73	.88	2 5/8 (3)	1 1/4	1 1/4
324	6.45	1.00	4.45	.73	.88	2 5/8 (3)	1 1/2	1 1/2
332	7.94	1.03	5.88	.94	1.19	3 1/2	2	2



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(3) 2 3/4 FOR COMMERCIAL BRASS

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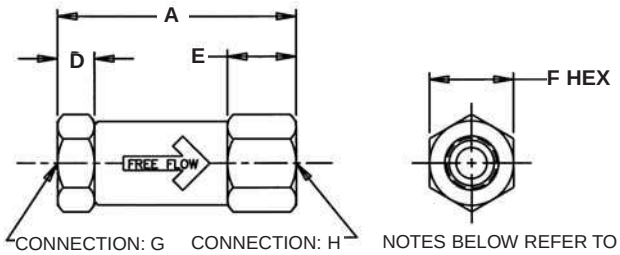
Inline Check and Relief Check Valves

Dimensions: Model 400

MODEL	A	B	C (REF)	D	E	F HEX.	G FPT	H FPT
404	1.94	-	-	.27	.56	11/16	1/8	1/8
406	2.66	-	-	.53	.98	13/16	1/4	1/4
408	2.58	-	-	.30	.72	1	3/8	3/8
410	3.19	-	-	.44	1.03	1 1/8	1/2	1/2
412	3.69	-	-	.56	1.19	1 7/16 (1)	3/4	3/4
416	4.19	-	-	.53	1.31	1 13/16 (2)	1	1
420	5.17	-	-	.73	1.59	2 5/8 (3)	1 1/4	1 1/4
424	5.19	-	-	.75	1.59	2 5/8 (3)	1 1/2	1 1/2
432	6.69	-	-	.94	2.00	3 1/2	2	2



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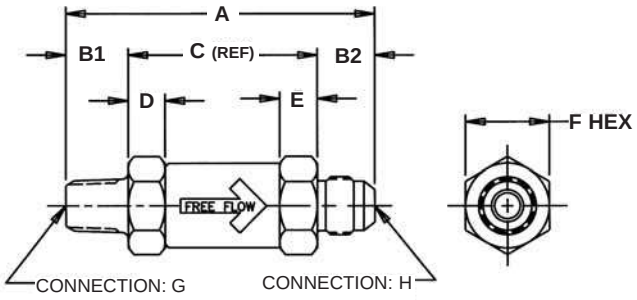
(2) 1 7/8 FOR 303 & 316 STAINLESS STEEL
(3) 2 3/4 FOR COMMERCIAL BRASS

Model 500

MODEL	A	B1	B2	C (REF)	D	E	F HEX.	G MPT	H JIC
504	2.48	.40	.55	1.53	.20	.22	11/16	1/8	1/4
506	2.95	.60	.56	1.79	.28	.35	13/16	1/4	3/8
508	3.50	.61	.66	2.23	.30	.37	1	3/8	1/2
510	3.98	.79	.76	2.43	.34	.37	1 1/8	1/2	5/8
512	4.45	.80	.86	2.79	.41	.44	1 7/16 (1)	3/4	3/4
516	5.37	1.00	.91	3.46	.53	.59	1 13/16 (2)	1	1
520	6.37	.97	.96	4.44	.73	.87	2 5/8 (3)	1 1/4	1 1/4
524	6.53	1.00	1.08	4.45	.73	.87	2 5/8 (3)	1 1/2	1 1/2
532	8.24	1.03	1.33	5.88	.94	1.18	3 1/2	2	2



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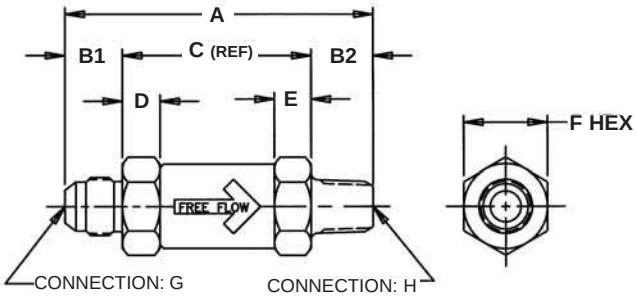
(2) 1 7/8 FOR 303 & 316 STAINLESS STEEL
(3) 2 3/4 FOR COMMERCIAL BRASS

Model 700

MODEL	A	B1	B2	C (REF)	D	E	F HEX.	G JIC	H MPT
704	2.49	.55	.40	1.54	.20	.23	11/16	1/4	1/8
706	2.95	.56	.60	1.79	.28	.35	13/16	3/8	1/4
708	3.50	.66	.61	2.23	.30	.38	1	1/2	3/8
710	3.99	.76	.79	2.44	.34	.38	1 1/8	5/8	1/2
712	4.46	.86	.80	2.80	.41	.44	1 7/16 (1)	3/4	3/4
716	5.38	.91	1.00	3.47	.53	.60	1 13/16 (2)	1	1
720	6.38	.96	.97	4.45	.73	.88	2 5/8 (3)	1 1/4	1 1/4
724	6.54	1.08	1.00	4.46	.73	.88	2 5/8 (3)	1 1/2	1 1/2
732	8.24	1.33	1.03	5.88	.94	1.19	3 1/2	2	2



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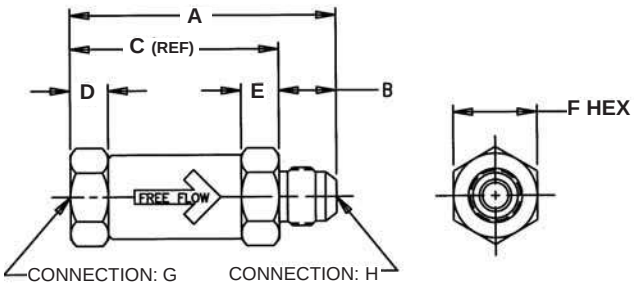
Inline Check and Relief Check Valves

Dimensions: Model 900

MODEL	A	B	C (REF)	D	E	F HEX.	G FPT	H JIC
904	2.14	.55	1.59	.27	.22	11/16	1/8	1/4
906	2.59	.56	2.03	.53	.35	13/16	1/4	3/8
908	2.89	.66	2.23	.30	.37	1	3/8	1/2
910	3.28	.76	2.52	.44	.37	1 1/8	1/2	5/8
912	3.80	.86	2.94	.56	.44	1 7/16 (1)	3/4	3/4
916	4.38	.91	3.47	.53	.59	1 13/16 (2)	1	1
920	5.41	.96	4.45	.73	.87	2 5/8 (3)	1 1/4	1 1/4
924	5.55	1.08	4.47	.75	.87	2 5/8 (3)	1 1/2	1 1/2
932	7.20	1.33	5.87	.94	1.18	3 1/2	2	2



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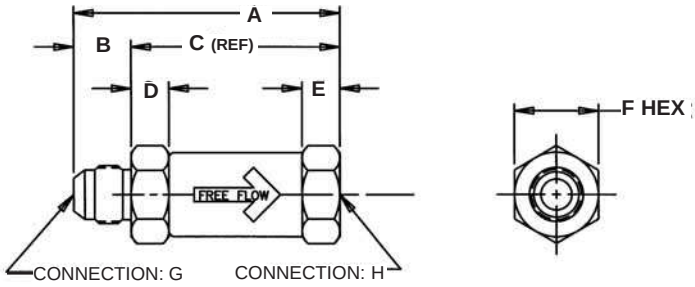
(2) 1 7/8 FOR 303 & 316 STAINLESS STEEL
(3) 2 3/4 FOR COMMERCIAL BRASS

Model 1100

MODEL	A	B	C (REF)	D	E	F HEX.	G JIC	H FPT
1104	2.43	.55	1.88	.20	.56	11/16	1/4	1/8
1106	2.97	.56	2.41	.28	.97	13/16	3/8	1/4
1108	3.24	.66	2.58	.30	.72	1	1/2	3/8
1110	3.85	.76	3.09	.34	1.03	1 1/8	5/8	1/2
1112	4.40	.86	3.54	.41	1.19	1 7/16 (1)	3/4	3/4
1116	5.10	.91	4.19	.53	1.31	1 13/16 (2)	1	1
1120	6.13	.96	5.17	.73	1.59	2 5/8 (3)	1 1/4	1 1/4
1124	6.26	1.08	5.18	.73	1.59	2 5/8 (3)	1 1/2	1 1/2
1132	8.02	1.33	6.69	.94	2.00	3 1/2	2	2

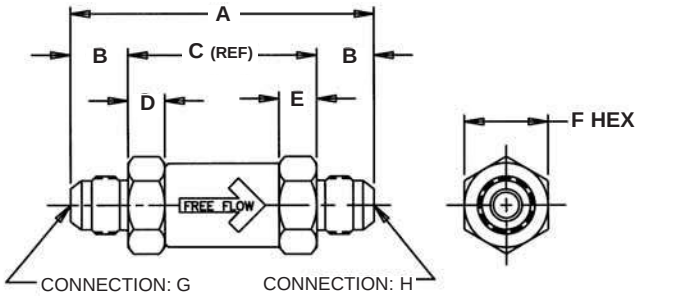


NOTES BELOW REFER TO COLUMN "F"
(1) 1 1/2 FOR 316 STAINLESS STEEL
(2) 1 7/8 FOR 303 & 316 STAINLESS STEEL
(3) 2 3/4 FOR COMMERCIAL BRASS

Model 1300

MODEL	A	B	C (REF)	D	E	F HEX.	G JIC	H JIC
1304	2.63	.55	1.53	.20	.22	11/16	1/4	1/4
1306	2.90	.56	1.78	.28	.35	13/16	3/8	3/8
1308	3.55	.66	2.23	.30	.37	1	1/2	1/2
1310	3.95	.76	2.43	.34	.37	1 1/8	5/8	5/8
1312	4.51	.86	2.79	.41	.44	1 7/16 (1)	3/4	3/4
1316	5.29	.91	3.47	.53	.59	1 13/16 (2)	1	1
1320	6.36	.96	4.44	.73	.87	2 5/8 (3)	1 1/4	1 1/4
1324	6.61	1.08	4.45	.73	.87	2 5/8 (3)	1 1/2	1 1/2
1332	8.54	1.33	5.88	.94	1.18	3 1/2	2	2

ALL DIMENSIONS (IN INCHES) ARE FOR REFERENCE ONLY.



NOTES BELOW REFER TO COLUMN "F"
(1) 1 1/2 FOR 316 STAINLESS STEEL
(2) 1 7/8 FOR 303 & 316 STAINLESS STEEL
(3) 2 3/4 FOR COMMERCIAL BRASS

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MADE IN USA

NFPA MEMBER

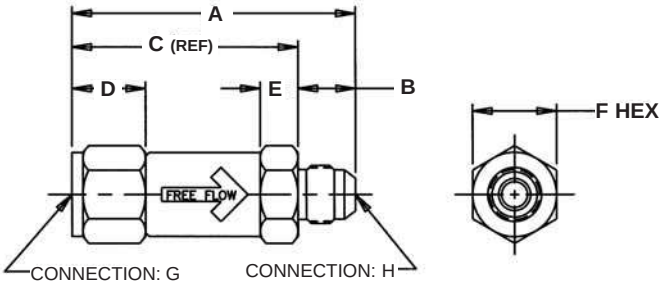
995 N. Ellsworth Avenue
Villa Park, IL 60181
Phone: 630-279-1550
FAX: 630-279-9669
www.kepner.com

KEPNER PRODUCTS COMPANY

Inline Check and Relief Check Valves

Dimensions: Model 1500

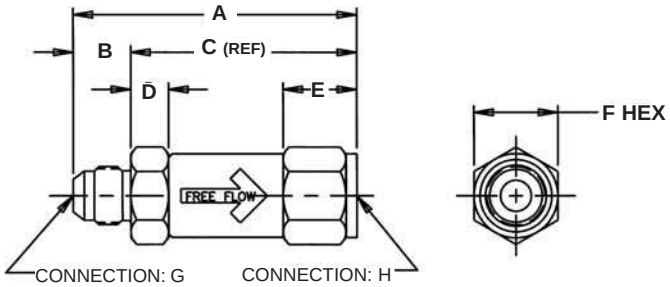
MODEL	A	B	C (REF)	D	E	F HEX.	G IJIC	H JIC
1504	2.47	.55	1.92	.60	.22	11/16	1/4	1/4
1506	2.65	.56	2.09	.58	.35	13/16	3/8	3/8
1508	3.28	.66	2.62	.68	.37	1	1/2	1/2
1510	3.61	.76	2.85	.77	.37	1 1/8	5/8	5/8
1512	4.17	.86	3.31	.93	.44	1 7/16 (1)	3/4	3/4
1516	4.80	.91	3.89	.95	.59	1 13/16 (2)	1	1
1520	5.66	.96	4.70	.99	.87	2 5/8 (3)	1 1/4	1 1/4
1524	6.05	1.08	4.97	1.25	.87	2 5/8 (3)	1 1/2	1 1/2
1532	7.45	1.33	6.12	1.19	1.18	3 1/2	2	2



NOTES BELOW REFER TO COLUMN "F"
(1) 1 1/2 FOR 316 STAINLESS STEEL
(2) 1 7/8 FOR 303 & 316 STAINLESS STEEL
(3) 2 3/4 FOR COMMERCIAL BRASS

Model 1700

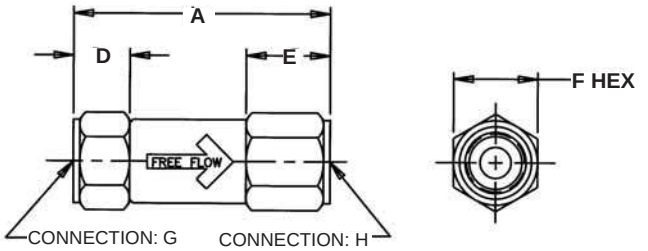
MODEL	A	B	C (REF)	D	E	F HEX.	G JIC	H IJIC
1704	2.55	.55	2.00	.20	.69	11/16	1/4	1/4
1706	2.93	.56	2.37	.28	.94	13/16	3/8	3/8
1708	3.25	.66	2.59	.30	.73	1	1/2	1/2
1710	3.91	.76	3.15	.34	1.09	1 1/8	5/8	5/8
1712	4.47	.86	3.61	.41	1.27	1 7/16 (1)	3/4	3/4
1716	5.19	.91	4.28	.53	1.41	1 13/16 (2)	1	1
1720	6.54	.96	5.58	.73	2.00	2 5/8 (3)	1 1/4	1 1/4
1724	6.66	1.08	5.58	.73	2.00	2 5/8 (3)	1 1/2	1 1/2
1732	8.52	1.33	7.19	.94	2.50	3 1/2	2	2



NOTES BELOW REFER TO COLUMN "F"
(1) 1 1/2 FOR 316 STAINLESS STEEL
(2) 1 7/8 FOR 303 & 316 STAINLESS STEEL
(3) 2 3/4 FOR COMMERCIAL BRASS

Model 1900

MODEL	A	B	C (REF)	D	E	F HEX.	G IJIC	H IJIC
1904	2.40	-	-	.60	.69	11/16	1/4	1/4
1906	2.68	-	-	.58	.94	13/16	3/8	3/8
1908	2.98	-	-	.68	.73	1	1/2	1/2
1910	3.58	-	-	.77	1.09	1 1/8	5/8	5/8
1912	4.13	-	-	.93	1.27	1 7/16 (1)	3/4	3/4
1916	4.70	-	-	.95	1.41	1 13/16 (2)	1	1
1920	5.83	-	-	.99	2.00	2 5/8 (3)	1 1/4	1 1/4
1924	6.10	-	-	1.25	2.00	2 5/8 (3)	1 1/2	1 1/2
1932	7.44	-	-	1.19	2.50	3 1/2	2	2



NOTES BELOW REFER TO COLUMN "F"
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(2) 1 7/8 FOR 303 & 316 STAINLESS STEEL
(3) 2 3/4 FOR COMMERCIAL BRASS

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995 N. Ellsworth Avenue
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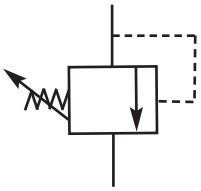
www.kepner.com

KEPNER PRODUCTS COMPANY

Adjustable Inline Relief Valves



These adjustable, spring-loaded poppet valves are used to limit system pressure. Excess pressure unseats the poppet, allowing flow with minimal increase in system pressure. As fluid is released the system pressure decreases until the spring force re-seats the poppet. Kepner's *Flexible Seal Seat™* ensures bubble-tight shutoff of liquid or gas.

The relief pressure can be set using a tamperproof internal adjustment screw. Standard and specialty valves handle a wide variety of applications requiring fast acting relief performance and tamperproof pressure adjustment.

Features and Benefits:

- *Flexible Seal Seat™* for zero leak (bubble-tight) seal
- Outer O-Ring provides non-pressurized threads
- Both O-Ring seals positively secured
- Wide relief adjustment range 50 to 2000 PSI (3.45 to 138 bar)
- Tamperproof Nylok® adjustment to set relief pressure/prevent slippage
- Poppet stop inside valve body prevents spring from bottoming out

Valve Specifications:

- End Connections: Pipe (MPT, FPT; 10 combinations)
  Inlet (MPT or FPT); Outlet (FPT); Side Outlet (1/4 inch FPT)
- Port Sizes: 1/4 inch, 3/8 inch, 1/2 inch
- Body Materials: Steel, 303 Stainless Steel
- O-Ring Seals: Teflon®, other materials available
- Temperature: -300°F to 450°F (-184°C to 232°C), O-Ring dependent
- Crack Pressure Ranges: Adjustable 50 to 2000 PSI (3.5 to 138 bar)
  3 Spring Ranges: 50 to 400 PSI (3.5 to 28 bar), 300 to 1000 PSI (21 to 69 bar), 900 to 2000 PSI (62 to 138 bar); factory preset pressure available
- Operating Pressure: to 3000 PSI (207 bar)
- Flow: to 10 GPM (38 LPM)

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KEPNER PRODUCTS COMPANY

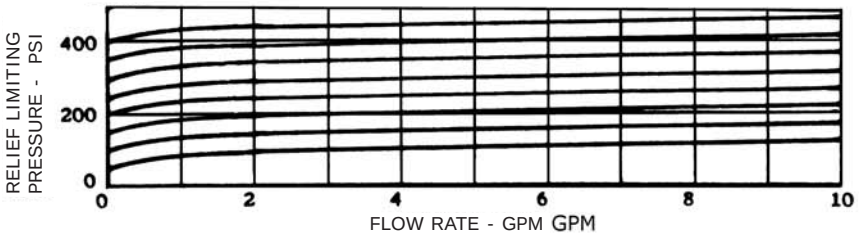
Adjustable Inline Relief Valves

Flow Charts:

Initial Setting

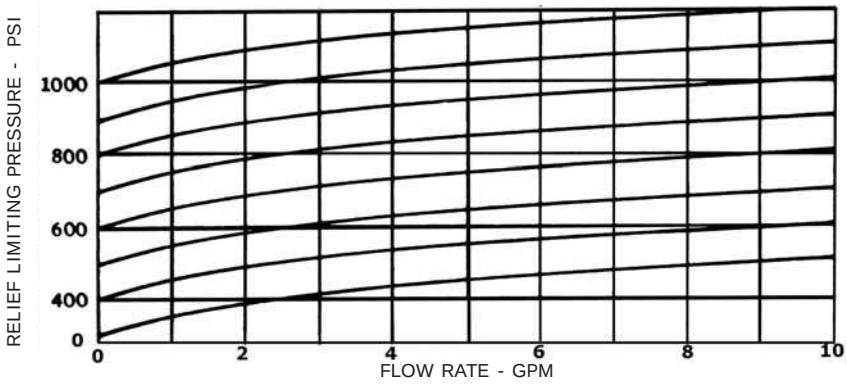
MODEL *2300-400

Curves indicate Pressure Drop vs Flow Rate



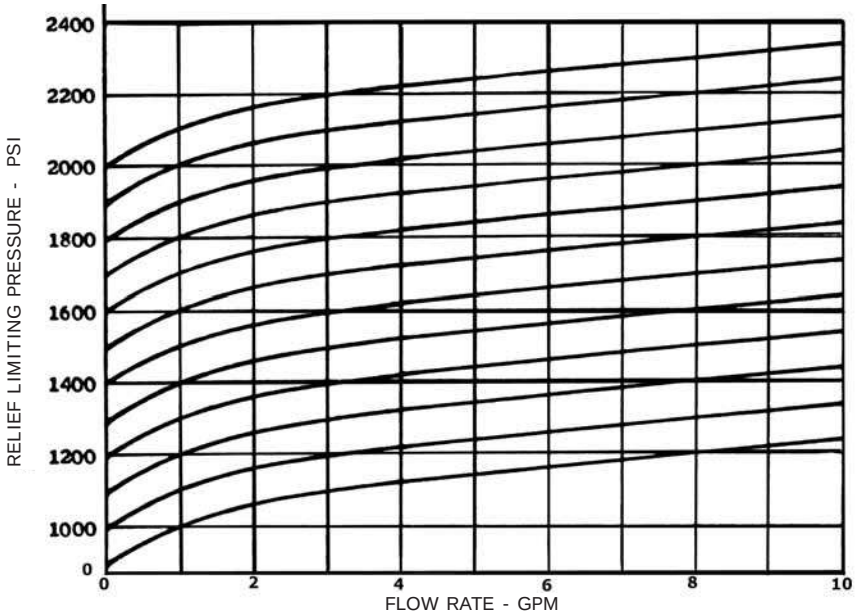
Initial Setting

MODEL *2300-1000



Initial Setting

MODEL *2300-2000



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Test Fluid: MIL-H-5606A Hydraulic Oil **Test Temp:** 100^{O} F (Viscosity 77.5 SUS) *TYP. - Covers Models 2300 thru 2309

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KEPNER PRODUCTS COMPANY

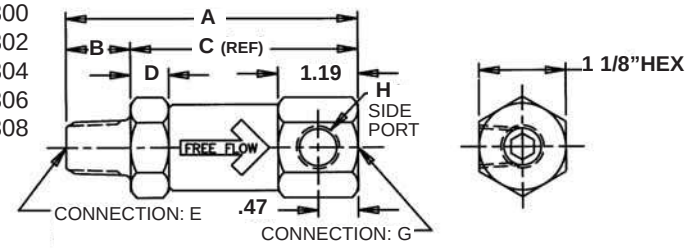
Adjustable Inline Relief Valves

Dimension Diagram and Part Numbers:

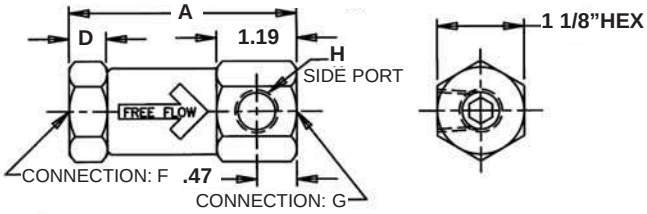
MODEL	A	B	C (REF)	D	E	F	G	H SIDE PORT
					MPT	FPT	FPT	FPT
2300	4.51	.79	3.72	.31	1/2	--	1/2	NONE
2301	3.84	--	--	.44	--	1/2	1/2	NONE
2302	4.33	.61	3.72	.31	3/8	--	3/8	NONE
2303	3.72	--	--	.31	--	3/8	3/8	NONE
2304	4.32	.60	3.72	.31	1/4	--	1/4	1/4
2305	3.72	--	--	.31	--	1/4	1/4	1/4
2306	4.51	.79	3.72	.31	1/2	--	1/4	1/4
2307	3.84	--	--	.44	--	1/2	1/4	1/4
2308	4.33	.61	3.72	.31	3/8	--	1/4	1/4
2309	3.72	--	--	.31	--	3/8	1/4	1/4

All dimensions (in inches) for reference only.

Model:
2300
2302
2304
2306
2308



Model:
2301
2303
2305
2307
2309



PORT SIZES

	INLET	OUTLET	SIDE OUTLET
00	1/2 MPT	1/2 FPT	NONE
01	1/2 FPT	1/2 FPT	NONE
02	3/8 MPT	3/8 FPT	NONE
03	3/8 FPT	3/8 FPT	NONE
04	1/4 MPT	1/4 FPT	1/4 FPT
05	1/4 FPT	1/4 FPT	1/4 FPT
06	1/2 MPT	1/4 FPT	1/4 FPT
07	1/2 FPT	1/4 FPT	1/4 FPT
08	3/8 MPT	1/4 FPT	1/4 FPT
09	3/8 FPT	1/4 FPT	1/4 FPT

CONSTRUCTION MATERIALS

C = STEEL D = 303 STAINLESS STEEL

CRACK PRESSURE RANGES

400 = 50 - 400 PSI CRACK
1000 = 300 - 1000 PSI CRACK
2000 = 900 - 2000 PSI CRACK

PART NUMBER EXAMPLE

23 05 C - 1000 (750PSI)

- **23** — BASE NO.
- **05** — PORT SIZES
- **C** — CONSTRUCTION MATERIALS
- **1000** — CRACK PRESSURE RANGES
- **(750PSI)** — FACTORY PRESET CRACK PRESSURE OPTIONAL

O-RING SEALS: TEFLON®

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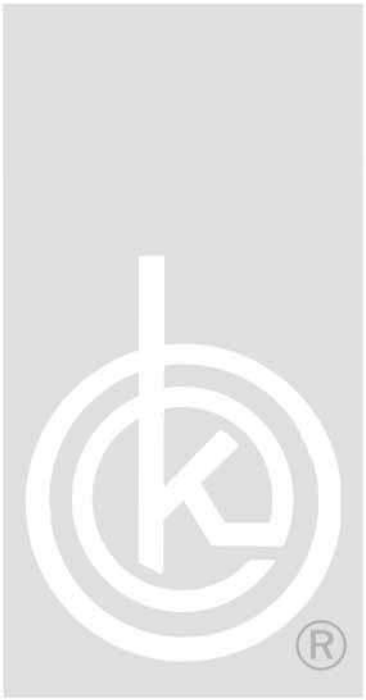
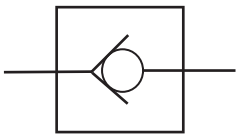
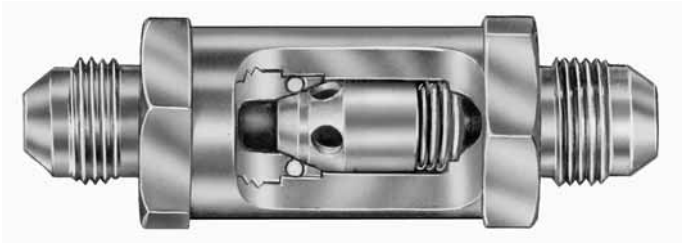


High Pressure Check and Relief/Check Valves





These inline valves allow free flow in only one direction, prevent backflow, and meet the industry's need for higher operating pressures. They also are used for relief and by-pass functions. Kepner's *Flexible Seal Seat™* combines metal-to-metal contact with a resilient seal seat ensuring bubble-tight shutoff of liquid or gas. This is an ideal choice for applications that require positive leak-tight sealing and long service life at pressures to 6000 PSI. Standard and specialty valves handle a wide variety of applications.

Features and Benefits:

- *Flexible Seal Seat™* for zero leak (bubble-tight) sealing to 6000 PSI
- O-Ring seal positively secured
- Non-pressurized threads
- Poppet stop inside valve body prevents spring from bottoming out
- Generous flow passages allow full flow with minimal pressure drop

Valve Specifications:

- End Connections: Pipe or Tube (NPT, JIC; 12 combinations)
- Port Sizes: 1/8 inch to 1 inch (3.2 mm to 25 mm)
- Body Materials: Steel, 303 Stainless Steel
- O-Ring Seals: Teflon®, other materials available
- Temperature: -300°F to 450°F (-184°C to 232°C), O-Ring dependent
- Relief/Check Valve Crack Pressures: 5 PSI (.35 bar), 10 PSI (0.7 bar), 25 PSI (1.7 bar), 50 PSI (3.5 bar) and 65 PSI (4.5 bar), others available
- Operating Pressure: to 6000 PSI (414 bar)
- Flow: to 25 GPM (95 LPM)

MADE IN USA

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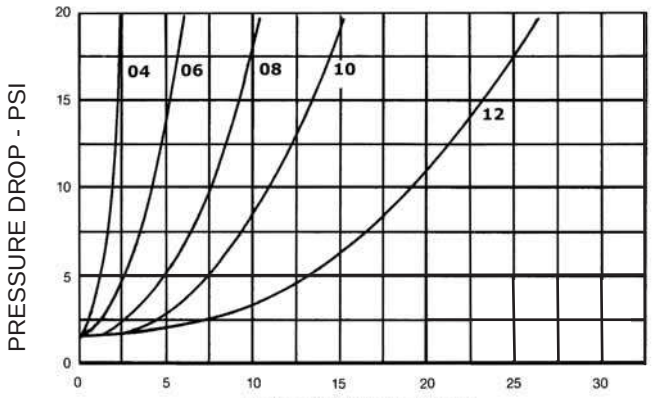
KEPNER PRODUCTS COMPANY

High Pressure Check and Relief/Check Valves

Flow Chart and Part Number: Fixed settings 1/8" to 1" sizes.



Test Fluid: Water Test Temp: 50°F

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PORT CONFIGURATIONS

59 IJIC - IJIC	IJIC TUBE TO TUBE IJIC	**47** JIC - MPT	JIC TUBE TO PIPE MPT
57 JIC - IJIC	JIC TUBE TO TUBE IJIC	**45** MPT - JIC	MPT PIPE TO TUBE JIC
55 IJIC - JIC	IJIC TUBE TO TUBE JIC	**44** FPT - FPT	FPT PIPE TO PIPE FPT
53 JIC - JIC	JIC TUBE TO TUBE JIC	**43** MPT- MPT	MPT PIPE TO PIPE MPT
51 JIC - FPT	JIC TUBE TO PIPE FPT	**42** FPT - MPT	FPT PIPE TO PIPE MPT
49 FPT - JIC	FPT PIPE TO TUBE JIC	**41** MPT - FPT	MPT PIPE TO PIPE FTP

PART NUMBER EXAMPLE

44 06 C - 3 - 25

CRACK PRESSURE

5 = 5 PSI CRACK
10 = 10 PSI CRACK
25 = 25 PSI CRACK
50 = 50 PSI CRACK
65 = 65 PSI CRACK
OTHERS AVAILABLE

PORT SIZES

04 = 1/8 PIPE - 1/4 TUBE
06 = 1/4 PIPE - 3/8 TUBE
08 = 3/8 PIPE - 1/2 TUBE
10 = 1/2 PIPE - 5/8 TUBE
12 = 3/4 PIPE - 3/4 TUBE
16 = 1" PIPE - 1" TUBE

O-RING SEALS

3 = TEFLON®

CONSTRUCTION MATERIALS

C = STEEL D = 303 STAINLESS STEEL

MADE IN USA

NATIONAL FLUID POWER ASSOCIATION NFPA MEMBER

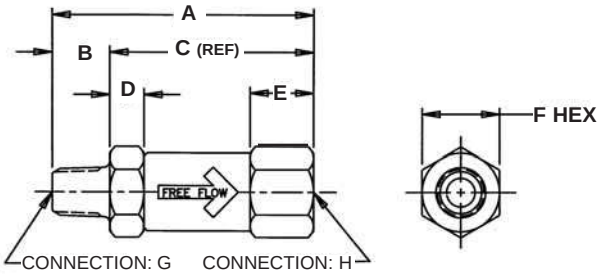
995 N. Ellsworth Avenue
Villa Park, IL 60181
Phone: 630-279-1550
FAX: 630-279-9669
www.kepner.com

KEPNER PRODUCTS COMPANY

Dimensions: Fixed settings 1/8" to 1" sizes

Model 4100

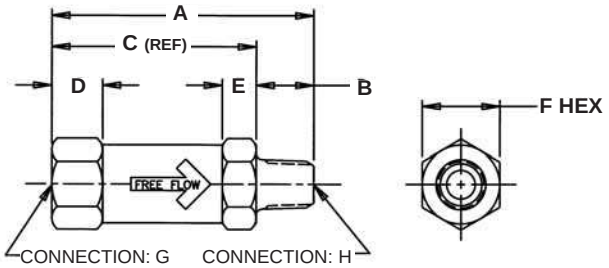
MODEL	A	B	C (REF)	D	E	F HEX.	G MPT	H FPT
4104	2.35	.40	1.95	.28	.61	13/16	1/8	1/8
4106	3.01	.60	2.41	.28	.97	1	1/4	1/4
4108	3.23	.61	2.62	.34	.70	1 1/8	3/8	3/8
4110	3.95	.79	3.16	.41	1.12	1 7/16	1/2	1/2
4112	4.46	.80	3.66	.53	1.34	1 13/16 (1)	3/4	3/4
4116	5.26	1.00	4.26	.61	1.38	2 1/4	1	1



NOTES REFER TO COLUMN "F"
(1) 1 7/8 FOR 303 STAINLESS STEEL

Model 4200

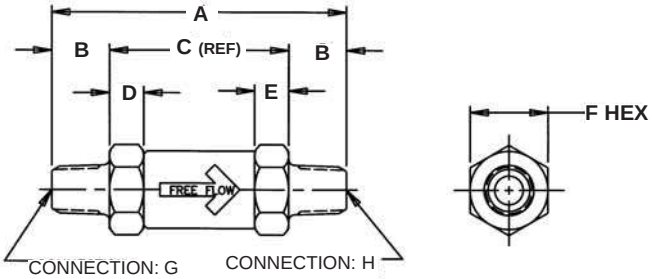
MODEL	A	B	C (REF)	D	E	F HEX.	G FPT	H MPT
4204	2.02	.40	1.62	.28	.27	13/16	1/8	1/8
4206	2.64	.60	2.04	.53	.35	1	1/4	1/4
4208	2.89	.61	2.28	.34	.36	1 1/8	3/8	3/8
4210	3.33	.79	2.54	.44	.48	1 7/16	1/2	1/2
4212	3.75	.80	2.95	.56	.60	1 13/16 (1)	3/4	3/4
4216	4.55	1.00	3.55	.61	.66	2 1/4	1	1



NOTES REFER TO COLUMN "F"
(1) 1 7/8 FOR 303 STAINLESS STEEL

Model 4300

MODEL	A	B	C (REF)	D	E	F HEX.	G MPT	H MPT
4304	2.42	.40	1.62	.28	.27	13/16	1/8	1/8
4306	2.99	.60	1.79	.28	.35	1	1/4	1/4
4308	3.50	.61	2.28	.34	.36	1 1/8	3/8	3/8
4310	4.09	.79	2.51	.41	.48	1 7/16	1/2	1/2
4312	4.52	.80	2.92	.53	.60	1 13/16 (1)	3/4	3/4
4316	5.54	1.00	3.54	.61	.66	2 1/4	1	1

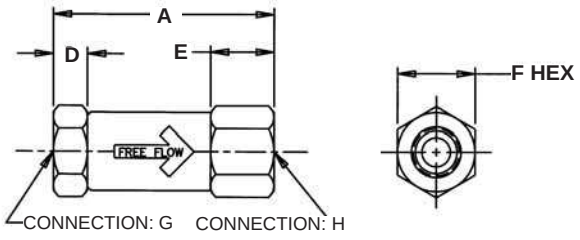


NOTES REFER TO COLUMN "F"
(1) 1 7/8 FOR 303 STAINLESS STEEL

Model 4400

MODEL	A	B	C (REF)	D	E	F HEX.	G MPT	H MPT
4404	1.95	-	-	.28	.61	13/16	1/8	1/8
4406	2.66	-	-	.53	.98	1	1/4	1/4
4408	2.63	-	-	.34	.70	1 1/8	3/8	3/8
4410	3.19	-	-	.44	1.12	1 7/16	1/2	1/2
4412	3.69	-	-	.56	1.34	1 13/16 (1)	3/4	3/4
4416	4.27	-	-	.61	1.38	2 1/4	1	1

ALL DIMENSIONS (IN INCHES) ARE FOR REFERENCE ONLY.



NOTES REFER TO COLUMN "F"
(1) 1 7/8 FOR 303 STAINLESS STEEL

MADE IN USA

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Phone: 630-279-1550
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www.kepner.com

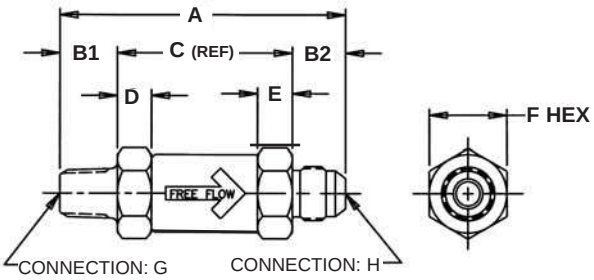
KEPNER PRODUCTS COMPANY

High Pressure Check and Relief/Check Valves

Dimensions: Fixed settings 1/8" to 1" sizes

Model 4500

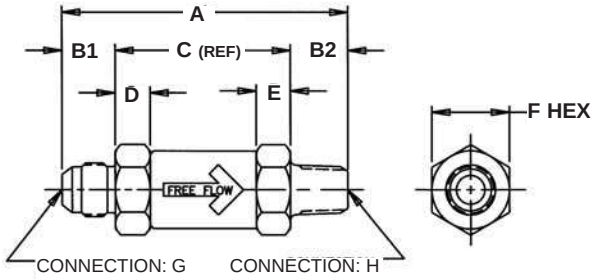
MODEL	A	B1	B2	C (REF)	D	E	F HEX.	G MPT	H JIC
4504	2.56	.40	.55	1.61	.28	.26	13/16	1/8	1/4
4506	2.95	.60	.56	1.79	.28	.35	1	1/4	3/8
4508	3.55	.61	.66	2.28	.34	.36	1 1/8	3/8	1/2
4510	4.04	.79	.76	2.49	.41	.46	1 7/16	1/2	5/8
4512	4.58	.80	.86	2.92	.53	.59	1 13/16 (1)	3/4	3/4
4516	5.45	1.00	.91	3.54	.61	.65	2 1/4	1	1



NOTES REFER TO COLUMN "F"
(1) 1 7/8 FOR 303 STAINLESS STEEL

Model 4700

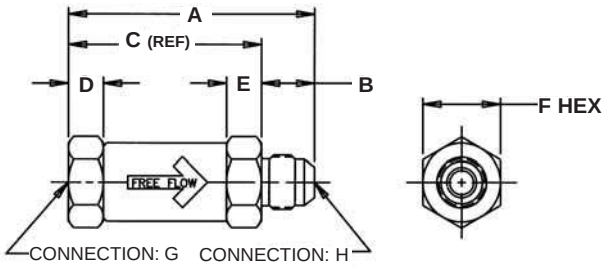
MODEL	A	B1	B2	C (REF)	D	E	F HEX.	G JIC	H MPT
4704	2.57	.55	.40	1.62	.28	.27	13/16	1/4	1/8
4706	2.95	.56	.60	1.79	.28	.35	1	3/8	1/4
4708	3.55	.66	.61	2.28	.34	.36	1 1/8	1/2	3/8
4710	4.05	.76	.79	2.50	.41	.48	1 7/16	5/8	1/2
4712	4.58	.86	.80	2.92	.53	.60	1 13/16 (1)	3/4	3/4
4716	5.46	.91	1.00	3.55	.61	.66	2 1/4	1	1



NOTES REFER TO COLUMN "F"
(1) 1 7/8 FOR 303 STAINLESS STEEL

Model 4900

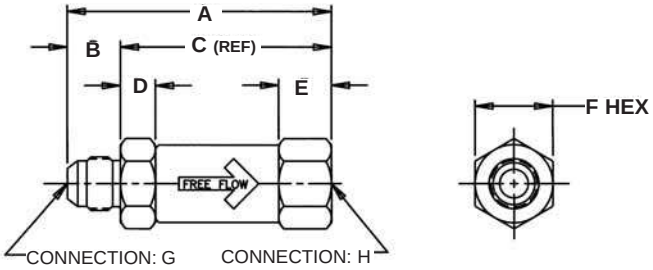
MODEL	A	B	C (REF)	D	E	F HEX.	G FPT	H JIC
4904	2.16	.55	1.61	.28	.26	13/16	1/8	1/4
4906	2.59	.56	2.03	.53	.35	1	1/4	3/8
4908	2.94	.66	2.28	.34	.36	1 1/8	3/8	1/2
4910	3.28	.76	2.52	.44	.46	1 7/16	1/2	5/8
4912	3.80	.86	2.94	.56	.59	1 13/16 (1)	3/4	3/4
4916	4.45	.91	3.54	.61	.65	2 1/4	1	1



NOTES REFER TO COLUMN "F"
(1) 1 7/8 FOR 303 STAINLESS STEEL

Model 5100

MODEL	A	B	C (REF)	D	E	F HEX.	G JIC	H FPT
5104	2.50	.55	1.95	.28	.61	13/16	1/4	1/8
5106	2.96	.56	2.40	.28	.98	1	3/8	1/4
5108	3.28	.66	2.62	.34	.70	1 1/8	1/2	3/8
5110	3.91	.76	3.15	.41	1.12	1 7/16	5/8	1/2
5112	4.52	.86	3.66	.53	1.34	1 13/16 (1)	3/4	3/4
5116	5.18	.91	4.27	.61	1.38	2 1/4	1	1



NOTES REFER TO COLUMN "F"
(1) 1 7/8 FOR 303 STAINLESS STEEL

ALL DIMENSIONS (IN INCHES) ARE FOR REFERENCE ONLY.

MADE IN USA

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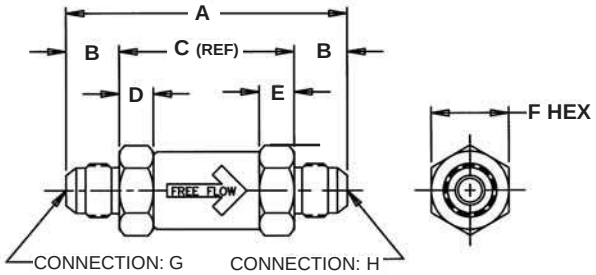
KEPNER PRODUCTS COMPANY

High Pressure Check and Relief/Check Valves

Dimensions: Fixed settings 1/4" to 1" sizes

Model 5300

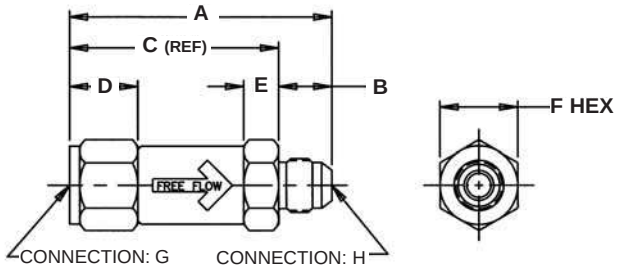
MODEL	A	B	C (REF)	D	E	F HEX.	G JIC	H JIC
5304	2.71	.55	1.61	.28	.26	13/16	1/4	1/4
5306	2.90	.56	1.78	.28	.35	1	3/8	3/8
5308	3.59	.66	2.27	.34	.36	1 1/8	1/2	1/2
5310	4.01	.76	2.49	.41	.46	1 7/16	5/8	5/8
5312	4.64	.86	2.92	.53	.59	1 13/16 (1)	3/4	3/4
5316	5.36	.91	3.54	.61	.65	2 1/4	1	1



NOTES REFER TO COLUMN "F"
(1) 1 7/8 FOR 303 STAINLESS STEEL

Model 5500

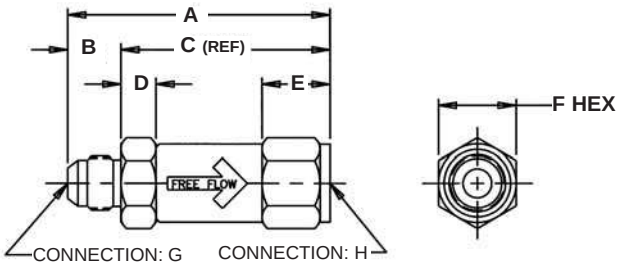
MODEL	A	B	C (REF)	D	E	F HEX.	G IJIC	H JIC
5504	2.47	.55	1.92	.60	.26	13/16	1/4	1/4
5506	2.71	.56	2.15	.65	.35	1	3/8	3/8
5508	3.28	.66	2.62	.68	.36	1 1/8	1/2	1/2
5510	3.61	.76	2.85	.77	.46	1 7/16	5/8	5/8
5512	4.17	.86	3.31	.93	.59	1 13/16 (1)	3/4	3/4
5516	4.80	.91	3.89	.95	.65	2 1/4	1	1



NOTES REFER TO COLUMN "F"
(1) 1 7/8 FOR 303 STAINLESS STEEL

Model 5700

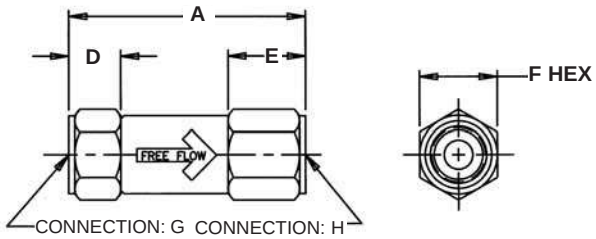
MODEL	A	B	C (REF)	D	E	F HEX.	G JIC	H IJIC
5704	2.63	.55	2.08	.28	.73	13/16	1/4	1/4
5706	2.93	.56	2.37	.28	.94	1	3/8	3/8
5708	3.30	.66	2.64	.34	.72	1 1/8	1/2	1/2
5710	3.98	.76	3.22	.41	1.19	1 7/16	5/8	5/8
5712	4.60	.86	3.74	.53	1.42	1 13/16 (1)	3/4	3/4
5716	5.27	.91	4.36	.61	1.47	2 1/4	1	1



NOTES REFER TO COLUMN "F"
(1) 1 7/8 FOR 303 STAINLESS STEEL

Model 5900

MODEL	A	B	C (REF)	D	E	F HEX.	G IJIC	H IJIC
5904	2.40	-	-	.60	.73	13/16	1/4	1/4
5906	2.74	-	-	.65	.94	1	3/8	3/8
5908	2.98	-	-	.68	.72	1 1/8	1/2	1/2
5910	3.58	-	-	.77	1.19	1 7/16	5/8	5/8
5912	4.13	-	-	.93	1.42	1 13/16 (1)	3/4	3/4
5916	4.70	-	-	.95	1.47	2 1/4	1	1



NOTES REFER TO COLUMN "F"
(1) 1 7/8 FOR 303 STAINLESS STEEL

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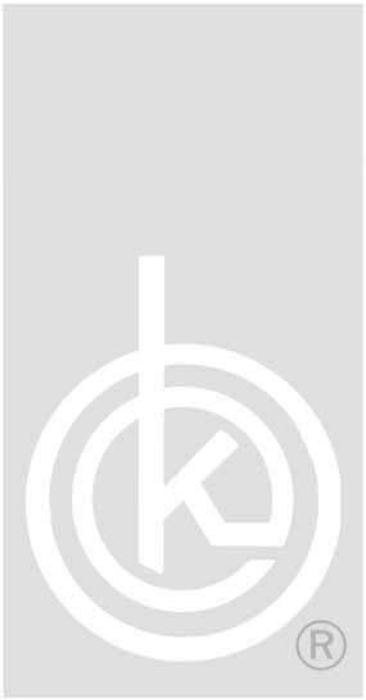
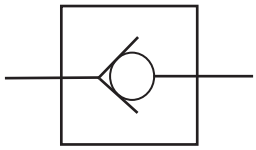
KEPNER PRODUCTS COMPANY



Inline Ball Check Valves



Ball check valves allow free flow in only one direction, prevent backflow, and are for applications where poppet style valves may not be suitable (such as media with contamination, viscous fluids, etc.). They are trouble free with large flow paths. The need for closely mating surfaces and sliding parts has been eliminated by the conical tension spring and seal seat design. Kepner's *Flexible Seal Seat™* design combines metal-to-metal contact with a resilient seal seat to ensure bubble-tight shutoff of liquid or gas, and long service life.

Features and Benefits:

- *Flexible Seal Seat™* for zero leak (bubble-tight) seal at low and high pressures
- O-Ring seal positively secured
- Stainless steel ball design; no sliding parts
- Exclusive conical tension spring design allows for greater flow
- Handles contamination, viscous liquids and slurries

Valve Specifications:

- End Connections/Sizes: 1/8 inch to 3/4 inch FPT
- Body Materials: Brass, 303 Stainless Steel
- O-Ring Seals: Buna-N, Teflon®, Viton®, other materials available
- Temperature: -300°F to 450°F (-184°C to 232°C), O-Ring dependent
- Crack Pressure: 1 to 3 PSI (.07 bar to 0.21 bar)
- Operating Pressure: to 3000 PSI (207 bar)
- Flow: to 25 GPM (95 LPM)

Consult Factory or Distributor for more help. Customer/user is solely responsible to select products suitable for their specific application requirements and to ensure proper installation, operation and maintenance of these products. Improper selection or use of products can cause personal injury or property damage. All sales are subject to Kepner Products Company Standard Terms and Conditions of Sale. Design subject to change without notice.

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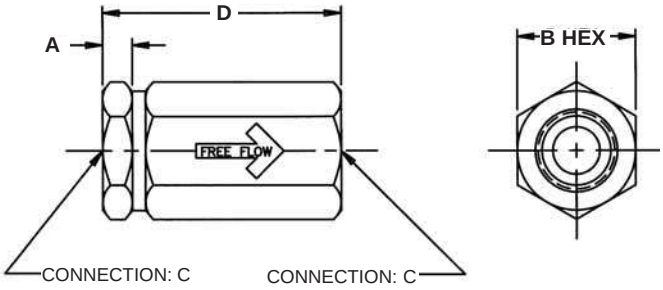
Inline Ball Check Valves

Dimension Diagram, Part Numbers and Flow Chart:

MODEL	A	B HEX.	C FPT	D
454	0.28	3/4	1/8	1.97
456	0.52	3/4	1/4	2.39
458	0.37	1 1/8	3/8	2.53
460	0.44	1 1/8	1/2	2.81
462	0.56	1 7/16	3/4	3.25



ALL DIMENSIONS (IN INCHES) ARE FOR REFERENCE ONLY.

PART NUMBER EXAMPLE

4 56 B - 1

BASE MODEL NUMBER

PORT SIZES

54 = 1/8 FPT
56 = 1/4 FPT
58 = 3/8 FPT
60 = 1/2 FPT
62 = 3/4 FPT

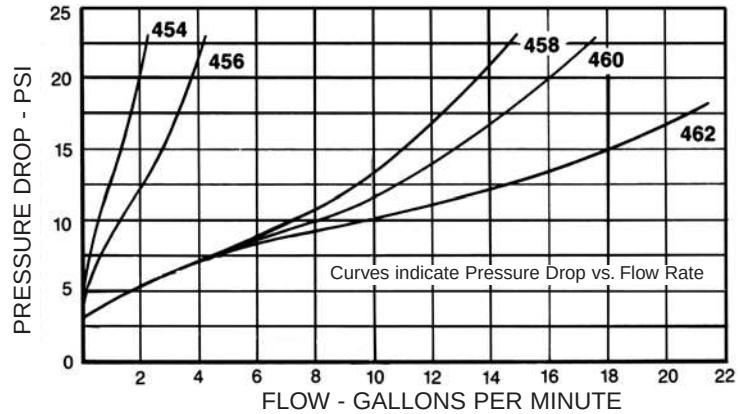
CONSTRUCTION MATERIALS

B = BRASS D = 303 STAINLESS STEEL

O-RING SEALS

1 = BUNA-N
3 = TEFLON®
18 = VITON®

CRACK PRESSURE: 1-3 PSI CRACK



Test Fluid: MIL-H-5606A Hydraulic Oil Test Temp: 75° F

MODEL SIZE	FEMALE PIPE THREAD
454	1/8”
456	1/4”
458	3/8”
460	1/2”
462	3/4”

Consult Factory or Distributor for more help. Customer/user is solely responsible to select products suitable for their specific application requirements and to ensure proper installation, operation and maintenance of these products. Improper selection or use of products can cause personal injury or property damage. All sales are subject to Kepner Products Company Standard Terms and Conditions of Sale. Design subject to change without notice.

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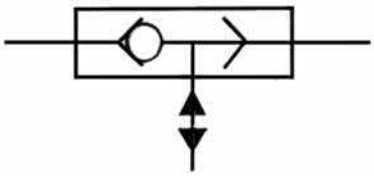
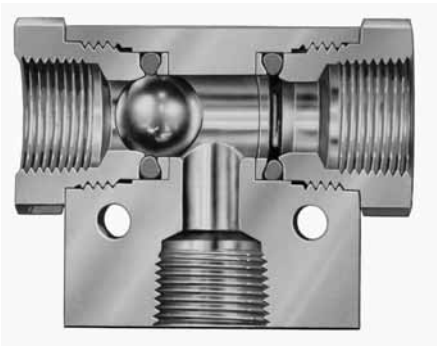
KEPNER PRODUCTS COMPANY

Inline Shuttle Valves





The shuttle valve permits flow from either of two inlet ports to a common outlet. A free floating metal ball shuttles according to the relative pressure at the two inlets. The higher pressure inlet flows through the valve and moves the ball to close the opposite inlet. Kepner's *Flexible Seal Seat™* combines metal-to-metal contact with a resilient seal seat to ensure bubble-tight shutoff of liquid or gas, and long service life. Shuttle valves can also flow in the reverse direction, and relieve system pressure when input is removed. Standard and specialty valves handle a wide variety of control applications, including use in logic circuits, for pilot signal input and venting, dual input pilot control, and for switching to alternate or standby systems.

Features and Benefits:

- *Flexible Seal Seat™* for zero leak (bubble-tight) seal at closed port
- Non-biased free floating shuttle ball with short travel path
- Minimal pressure differential shifting
- O-Ring seal positively secured
- Unobstructed flow paths allow full flow and minimal pressure drop

Valve Specifications:

- End Connections/Sizes: 1/8 inch to 3/4 inch FPT
- Body Materials: Brass, Steel, 303 Stainless Steel
- O-Ring Seals: Buna-N, Teflon®, Viton®, other materials available
- Temperature: -300°F to 450°F (-184°C to 232°C), O-Ring dependent
- Operating Pressure: to 3000 PSI (207 bar)
- Flow: to 60 GPM (227 LPM)

Consult Factory or Distributor for more help. Customer/user is solely responsible to select products suitable for their specific application requirements and to ensure proper installation, operation and maintenance of these products. Improper selection or use of products can cause personal injury or property damage. All sales are subject to Kepner Products Company Standard Terms and Conditions of Sale. Design subject to change without notice.

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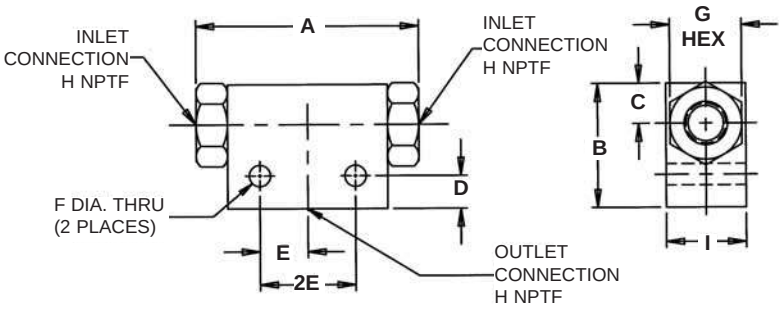
KEPNER PRODUCTS COMPANY

Shuttle Valves

Dimension Diagram, Part Numbers and Flow Chart:

MODEL	A	B	C	D	E	F	G HEX.	H FPT	I
2454	2.24	1.25	.38	.34	.50	.22	3/4	1/8	.75
2456	2.71	1.25	.38	.34	.50	.22	3/4	1/4	.75
2458	2.96	2.00	.63	.56	.75	.28	1 1/8	3/8	1.25
2460	3.09	2.00	.63	.56	.75	.28	1 1/8	1/2	1.25
2462	3.60	2.50	.75	.88	.81	.28	1 7/16	3/4	1.50

ALL DIMENSIONS (IN INCHES) ARE FOR REFERENCE ONLY.



PART NUMBER EXAMPLE

24 56 C - 1

BASE MODEL NUMBER

PORT SIZES

54 = 1/8 FPT
56 = 1/4 FPT
58 = 3/8 FPT
60 = 1/2 FPT
62 = 3/4 FPT

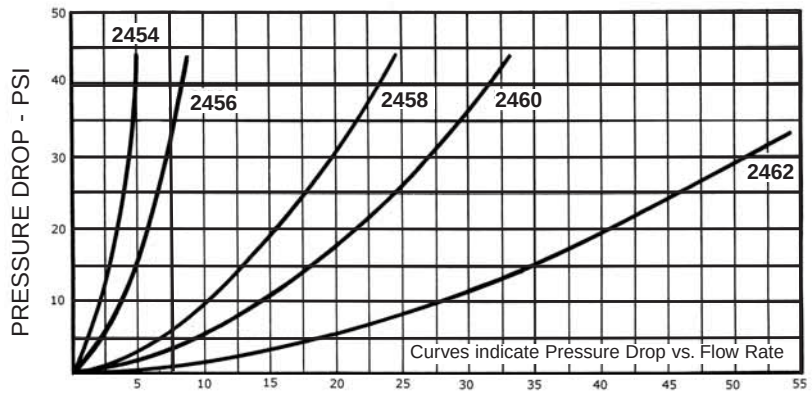
CONSTRUCTION MATERIALS

B = BRASS C = STEEL D = 303 STAINLESS STEEL

O-RING SEALS

1 = BUNA-N
3 = TEFLON®
9 = NEOPRENE
18 = VITON®
25 = ETHYLENE PROPYLENE

CRACK PRESSURE: 1-3 PSI CRACK



Test Fluid: MIL-H-5606A Hydraulic Oil Test Temp: 75° F

MODEL SIZE	NPTF FEMALE PIPE THREAD
2454	1/8”
2456	1/4”
2458	3/8”
2460	1/2”
2462	3/4”

Consult Factory or Distributor for more help. Customer/user is solely responsible to select products suitable for their specific application requirements and to ensure proper installation, operation and maintenance of these products. Improper selection or use of products can cause personal injury or property damage. All sales are subject to Kepner Products Company Standard Terms and Conditions of Sale. Design subject to change without notice.

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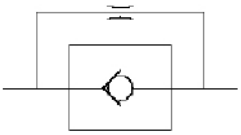
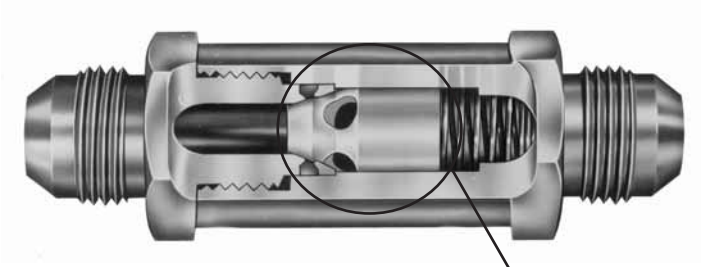
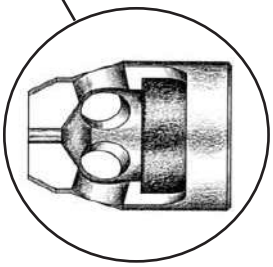
Fixed Orifice Flow Control Restrictor Valves







Fixed Orifice Flow Controls provide free flow in one direction and restricted (metered) flow in the reverse direction. They are standard Kep-O-seal® or Kepsēl® check valves, equipped with a calibrated orifice drilled through the valve poppet nose. Kepner's bubble-tight *Flexible Seal Seat™* ensures that the reverse flow is precisely controlled by confining it to the calibrated orifice. Such valves are often used in charging lines for cylinders, containers, or accumulators where it is desired to rapidly charge and then bleed back the charged fluid at a pre-determined rate. These valves handle many other applications.

Features and Benefits:

- Generous flow passages allow full free-flow with minimal pressure drop
- Metered reverse flow
- Tamperproof internal orifice
- Rugged and dependable

Valve Specifications:

- Fixed Orifice Flow Control Restrictor sizes and specifications are the same as those shown for the standard Kep-O-seal® or Kepsēl® check valves, except for cracking pressure and internal leakage which obviously do not apply.

- The valve orifice is drilled to customer's specifications. Test data and flow calibration based on Air or MIL-H-5606 Hydraulic Oil can be provided.

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Villa Park, IL 60181
Phone: 630-279-1550
FAX: 630-279-9669
www.kepner.com

KEPNER PRODUCTS COMPANY

Fixed Orifice Flow Control Restrictor Valves

*Part Numbers: Kep-O-seal® Inline and Kepsel® Cartridge Type Insert Fixed Orifice Flow Control Restrictor Valves**

1/8" TO 3" SIZES PART NUMBER EXAMPLE

4 06 C - 1 - 25 (.062)

See Kep-O-seal® Inline Check and Relief Check Valves and add the Orifice Size to the Part Number as shown in the Part Number Example.

ORIFICE SIZE (Thousandths of an inch)

1/16" to 2" NOMINAL SIZES PART NUMBER EXAMPLE

22 06 C - 1 - 25 (.062)

See Kepsel® Cartridge Check and Relief Check Valves, and add the Orifice Size to the Part Number as shown in the Part Number Example.

ORIFICE SIZE (Thousandths of an inch)

*NOTE: All poppet designs can be converted to Flow Control Restrictor Valves by adding an Orifice and Designator as shown in the Part Number Examples above.

Consult Factory or Distributor for more help. Customer/user is solely responsible to select products suitable for their specific application requirements and to ensure proper installation, operation and maintenance of these products. Improper selection or use of products can cause personal injury or property damage. All sales are subject to Kepner Products Company Standard Terms and Conditions of Sale. Design subject to change without notice.

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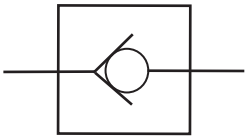
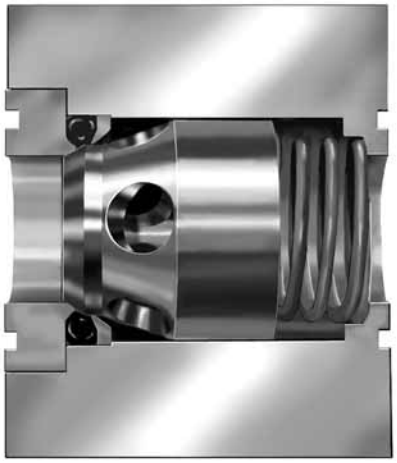
Split Flange Check and Relief/Check Valves





The flanged, spring-operated, poppet valves allow free flow in only one direction and prevent backflow. They are also used for relief and by-pass functions. The valves can be direct mounted to pumps, motors, and other such applications where threaded end connections are impractical or inconvenient. Kepner's *Flexible Seal Seat™* combines metal-to-metal contact with a resilient seal seat ensuring dependable bubble-tight shutoff of liquid or gas, as well as surge protection and long service life. Standard and specialty valve designs handle a wide variety of applications.

Features and Benefits:

- *Flexible Seal Seat™* for zero leak (bubble-tight) seal at low and high pressures
- SAE 4-bolt, Code 61 mounting; easy installation and maintenance
- O-Ring seal positively secured
- Poppet stop inside valve body prevents spring from bottoming out
- Generous flow passages allow full flow with minimal pressure drop

Valve Specifications:

- Nominal SAE Flange Sizes: 3/4 inch to 2 inch (19 mm to 51mm)
- Body Materials: Steel
- O-Ring Seals: Buna-N, Neoprene, Viton®, EP, other materials available
- Temperature: -300°F to 450°F (-184°C to 232°C), O-Ring dependent
- Check Valve Crack Pressure: 1 to 2 PSI (.07 bar to 0.14 bar)
- Relief/Check Valve Crack Pressures: 5 PSI (.35 bar), 10 PSI (0.7 bar), 25 PSI (1.7 bar), 50 PSI (3.5 bar), 65 PSI (4.5 bar), others available
- Operating Pressure: to 3000 PSI (207 bar)
- Flow: to 120 GPM (454 LPM)

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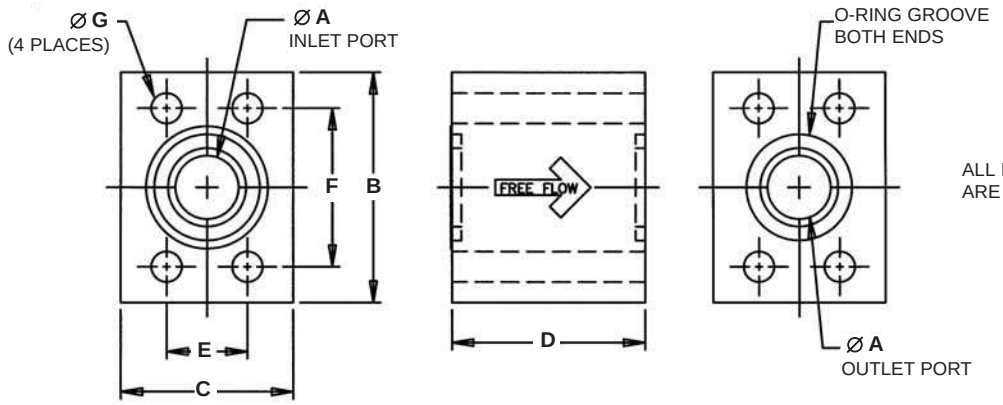
KEPNER PRODUCTS COMPANY

Split Flange Check Valves

Dimension Diagram and Part Numbers:



ALL DIMENSIONS (IN INCHES)
ARE FOR REFERENCE ONLY.

MODEL	SAE FLANGE SIZE	A	B	C	D	E	F	G	EXTERNAL O-RING SIZE
2612	3/4	.75	3.00	2.00	2.59	.88	1.88	0.41	214
2616	1	.84	3.00	2.00	2.59	1.03	2.06	0.41	219
2620	1 1/4	1.19	3.50	2.50	3.00	1.19	2.31	0.47	222
2624	1 1/2	1.31	4.00	3.00	3.38	1.41	2.75	0.53	225
2632	2	1.69	4.00	3.50	4.19	1.69	3.06	0.53	228

PART NUMBER EXAMPLE

26 16 C - 1 - (25)

BASE MODEL NUMBER

NOMINAL SIZES

12 = 3/4”
16 = 1”
20 = 1 1/4”
24 = 1 1/2”
32 = 2”

CONSTRUCTION MATERIALS

C = STEEL

O-RING SEALS

1 = BUNA-N 9 = NEOPRENE 18 = VITON®
25 = ETHYLENE PROPYLENE OTHERS AVAILABLE

RELIEF CRACK PRESSURES

5=5 PSI CRACK
10=10 PSI CRACK
25=25 PSI CRACK
50=50 PSI CRACK
65=65 PSI CRACK

STANDARD CRACK PRESSURE

1-3 PSI CRACK

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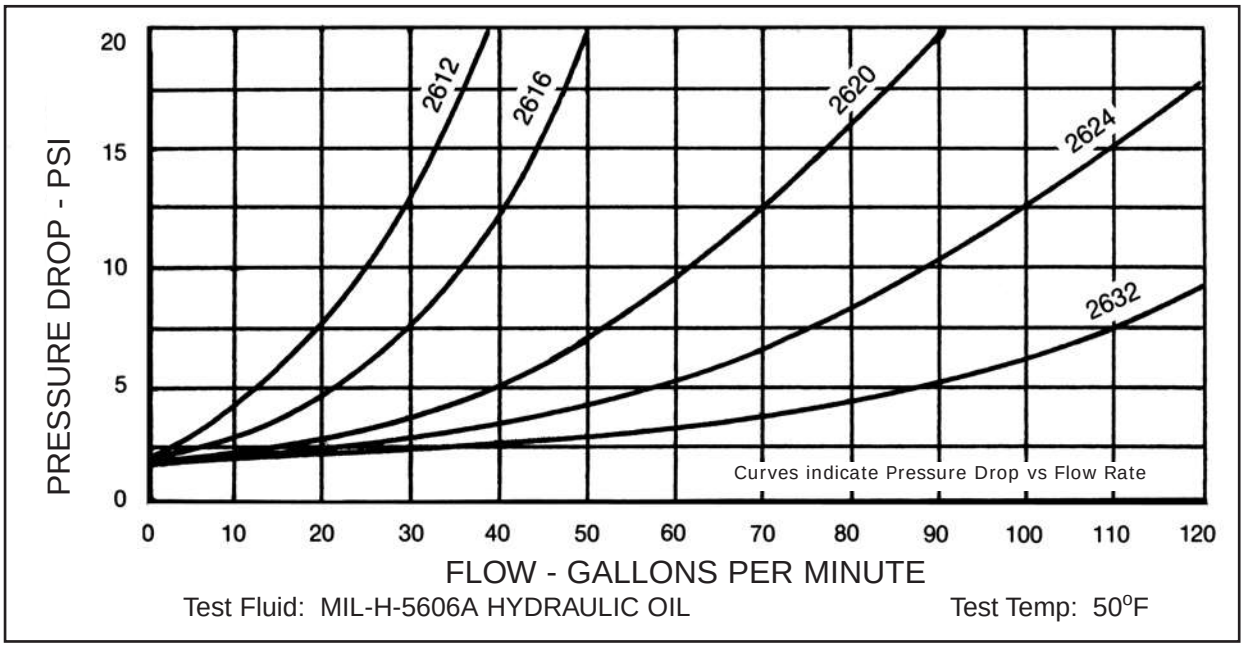
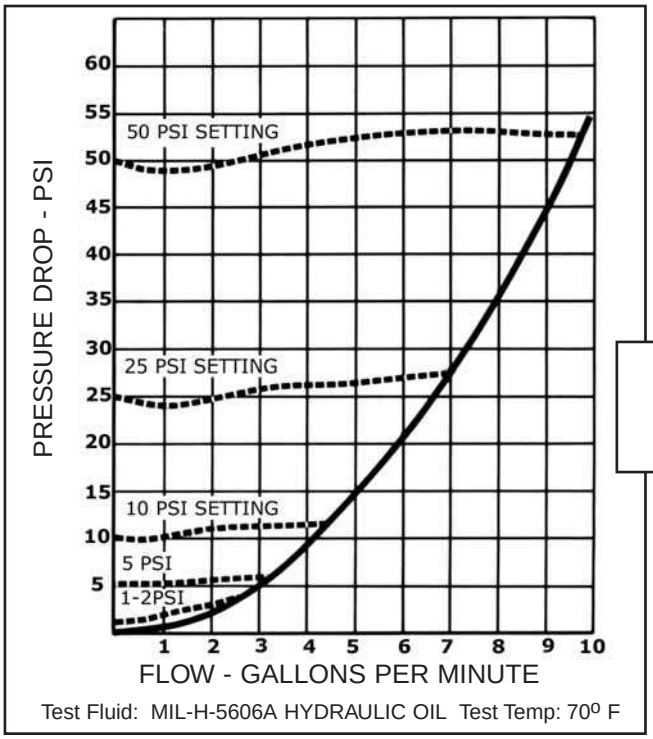
Flow Charts:



Test Fluid: MIL-H-5606A HYDRAULIC OIL Test Temp: 50°F



Test Fluid: MIL-H-5606A HYDRAULIC OIL Test Temp: 70° F

MODEL SIZE	SAE FLANGE
2612	3/4”
2616	1”
2620	1-1/4”
2624	1-1/2”
2632	2”

EXAMPLE WITH VARIOUS RELIEF SETTINGS

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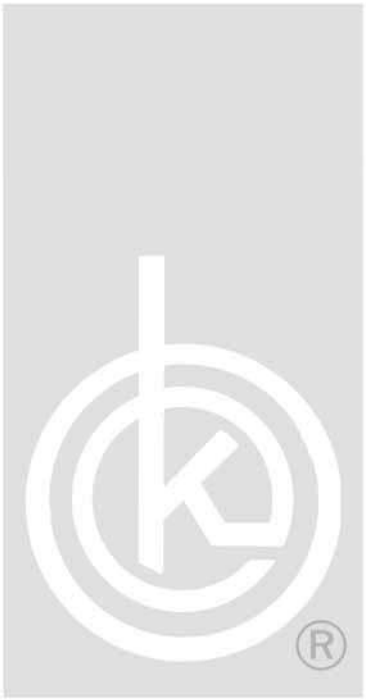
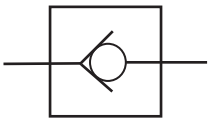
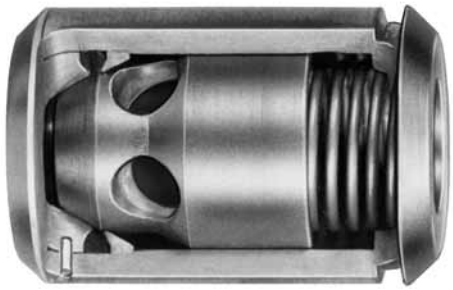


Kepsēl® Cartridge Type Insert Check Valves





Kepsēl® cartridge valves are designed for simple installation (no expensive machining for cavity) and offer the same outstanding performance as their counterpart Kep-O-seal® inline valves. These spring-operated poppet valves, with optional relief settings, allow free flow in only one direction and prevent backflow. They also are used for relief and by-pass functions. Kepner's *Flexible Seal Seat™* ensures bubble-tight shutoff of liquid or gas, and long service life. Standard and specialty valve designs handle a wide variety of applications, and are ideal for use in sub-plate and manifold assemblies, pump inlet/outlet, and cylinder blocks.

Features and Benefits:

- *Flexible Seal Seat™* for zero leak (bubble-tight) seal at low and high pressures
- No threaded connections (avoid potential leakage)
- O-Ring seal positively secured
- Poppet stop inside valve body prevents spring from bottoming out
- Generous flow passages allow full flow with minimal pressure drop
- Compact, easy installation - Accessory Kepner Holding Device Kits available

Valve Specifications:

- Nominal Sizes: 1/16 inch to 2 inch (1.6 mm to 51 mm; 9 Sizes)
- Body Materials: Brass, Steel, 303 or 316 Stainless Steel
- O-Ring Seals: Buna-N, Neoprene, Viton®, EP, other materials available
- Temperature: -300°F to 450°F (-184°C to 232°C), O-Ring dependent
- Check Crack Pressure: 1 to 2 PSI (.07 bar to .14 bar)
- Relief/Check Crack Pressures: 5 PSI (.35 bar), 10 PSI (0.7 bar), 25 PSI (1.7 bar), 50 PSI (3.5 bar) and 65 PSI (4.5 bar), others available
- Operating Pressure: to 3000 PSI (207 bar)
- Flow: to 200 GPM (757 LPM)

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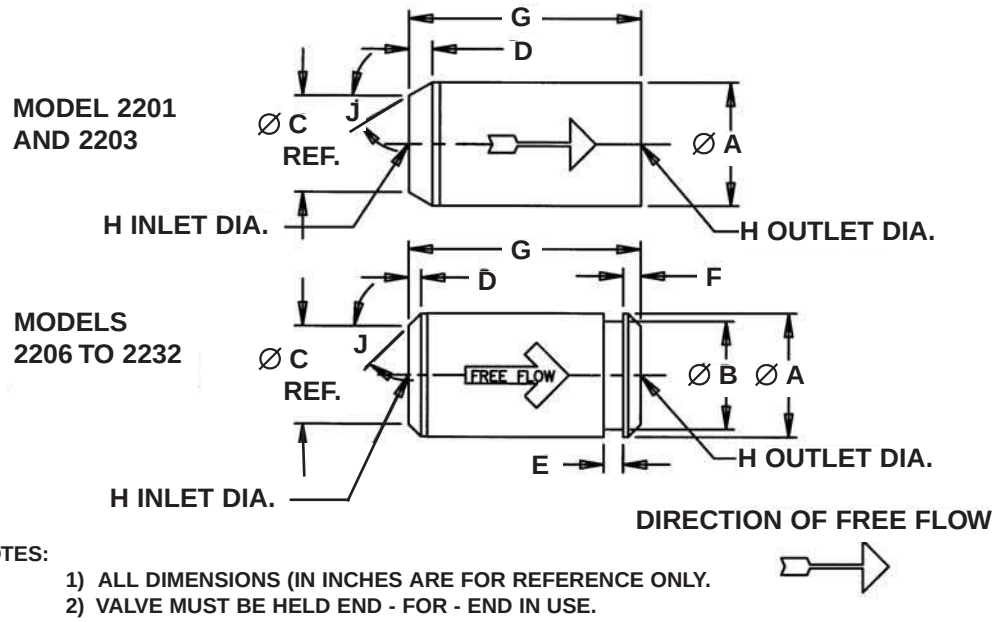
KEPNER PRODUCTS COMPANY

Cartridge Type Insert Check Valves

Dimension Diagrams:



NOTES:

1) ALL DIMENSIONS (IN INCHES ARE FOR REFERENCE ONLY.
2) VALVE MUST BE HELD END - FOR - END IN USE.

MODEL	A	B	C REF	D	E	F	G	H	J	EXTERNAL SEAL O-RING SIZE
2201	.311 / .308	--	.17	.12	--	--	.630 / .621	.09	30°	008
2203	.498 / .494	--	.30	.09	--	--	.844 / .835	.22	45°	012
2206	.655 / .650	.543 / .538	.47	.09	.10	.11	1.224 / 1.215	.30	45°	015
2208	.811 / .806	.699 / .695	.62	.09	.10	.11	1.500 / 1.491	.39	45°	017
2210	.999 / .994	.886 / .881	.81	.08	.10	.11	1.554 / 1.545	.48	45°	020
2212	1.217 / 1.212	1.106 / 1.102	1.03	.09	.10	.11	1.940 / 1.931	.61	45°	024
2216	1.686 / 1.681	1.516 / 1.511	1.41	.14	.13	.17	2.625 / 2.615	.84	45°	128
2224	2.311 / 2.306	2.142 / 2.136	2.03	.14	.13	.17	3.254 / 3.245	1.31	45°	138
2232	3.311 / 3.306	3.070 / 3.066	2.94	.18	.19	.26	4.505 / 4.496	1.78	45°	234

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Kepsel® Cartridge Type Insert Check Valves

Part Number and Flow Charts:

PART NUMBER EXAMPLE

22 06 C - 1

BASE MODEL NUMBER

NOMINAL SIZES

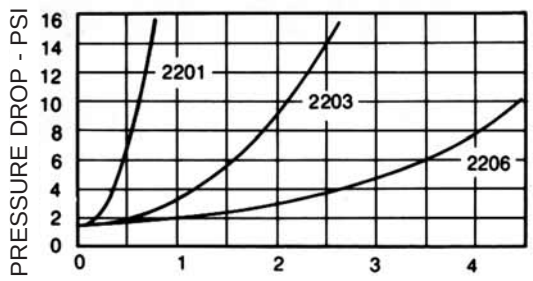
01 = 1/16”	08 = 3/8”	16 = 1”
03 = 1/8”	10 = 1/2”	24 = 1 1/2”
06 = 1/4”	12 = 3/4”	32 = 2”

CONSTRUCTION MATERIALS

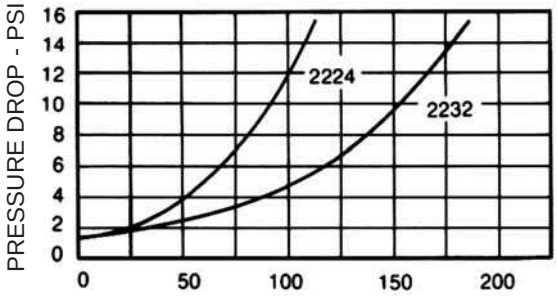
B = BRASS	D = 303 STAINLESS STEEL
C = STEEL	F = 316 STAINLESS STEEL

O-RING SEALS

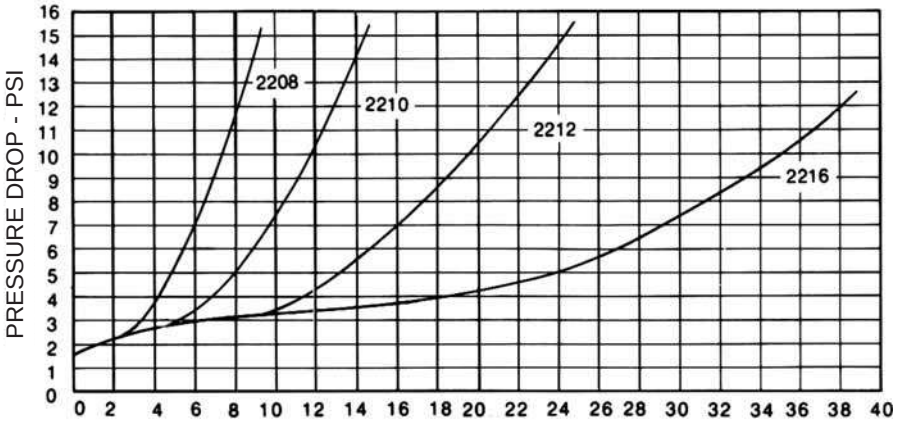
1 = BUNA-N 9 = NEOPRENE 18 = VITON® 25 = ETHYLENE PROPYLENE OTHERS AVAILABLE



Test Fluid: MIL-H-5606A Hydraulic Oil Test Temp: 75° F



Test Fluid: MIL-H-5606A Hydraulic Oil
Test Temp: 75° F



Test Fluid: MIL-H-5606A Hydraulic Oil Test Temp: 75° F

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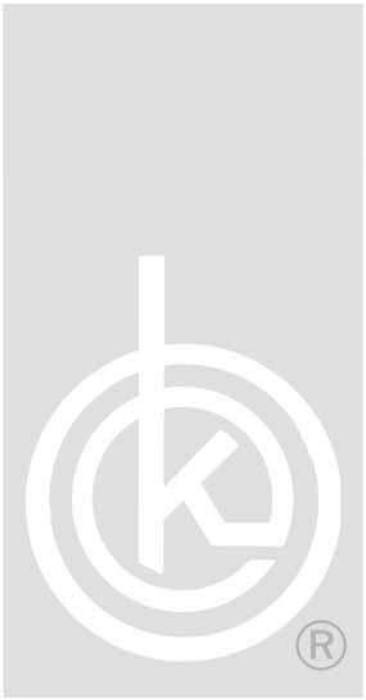
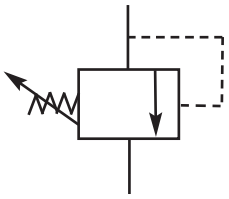


Kepsēl® Cartridge Type Insert Adjustable Relief Valves



The Kepsēl® cartridge has the same internal features as its counterpart Kep-O-seal® adjustable inline relief valve.These adjustable, spring-loaded poppet valves are used to limit system pressure. Excess pressure unseats the poppet, allowing flow with minimal increase in system pressure. As fluid is released the system pressure decreases until the spring force re-seats the poppet. Kepner's *Flexible Seal Seat*™ ensures bubble-tight shutoff of liquid or gas. The relief pressure can be set using a tamperproof internal adjustment screw. Standard and specialty valves handle a wide variety of relief applications, and are ideal for use in a manifold, sub-plate, or cylinder head.

Features and Benefits:

- *Flexible Seal Seat*™ for zero leak (bubble-tight) seal
- No threaded connections (avoid potential leakage)
- O-Ring seals positively secured
- Wide relief adjustment range 50 to 2000 PSI (3.45 to 138 bar)
- Tamperproof Nylok® adjustment set relief pressure/prevent slippage
- Poppet stop inside valve body prevents spring from bottoming out
- Compact, easy installation - Accessory Kepner Holding Device Kits available

Valve Specifications:

- Size: 1 inch cavity (25.4 mm)
- Body Materials: Steel, 303 Stainless Steel
- O-Ring Seals: Teflon®, other materials available
- Temperature: -300°F to 450°F (-184°C to 232°C), O-Ring dependent
- Crack Pressure Ranges: Adjustable 50 to 2000 PSI (3.5 to 138 bar)
  3 Spring Ranges: 50 to 400 PSI (3.5 to 28 bar), 300 to 1000 PSI (21 to 69 bar), 900 to 2000 PSI (62 to 138 bar); factory preset pressure available
- Operating Pressure: to 3000 PSI (207 bar)
- Flow: to 10 GPM (38 LPM)

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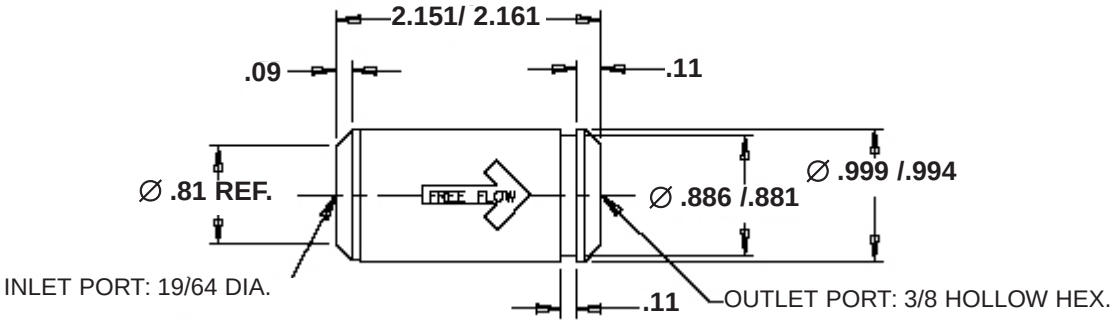
KEPNER PRODUCTS COMPANY

Cartridge Type Insert
Adjustable Relief Valves

Dimension Diagram and Part Number:



NOTES:
1. CRACK PRESSURE ADJUSTABLE
2. VALVE MUST BE HELD END FOR END IN USE
3. ALL DIMENSIONS (IN INCHES) ARE FOR REFERENCE ONLY

PART NUMBER EXAMPLE

1354 C - 1000

BASE MODEL NUMBER

CONSTRUCTION MATERIALS

C = STEEL D = 303 STAINLESS STEEL

O-RING SEALS

EXTERNAL SEAL: STANDARD SIZE NUMBER: 020

INTERNAL SEAL: TEFLON®

Elastomeric seals available on request.

ADJUSTMENT RANGE

ADJUSTMENT

By means of a standard 3/8" hex wrench inserted through the inline outlet port.

MODEL SUFFIX	ADJUSTMENT RANGE
-400	50 TO 400 PSI
-1000	300 TO 1000 PSI
-2000	900 TO 2000 PSI

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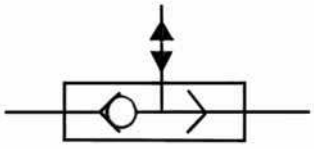
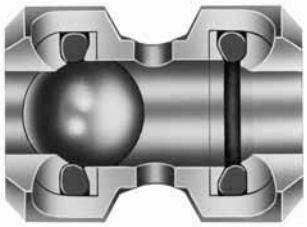
KEPNER PRODUCTS COMPANY

Kepsel® Cartridge Type Insert Shuttle Valves





The cartridge shuttle valve permits flow from either of two inlet ports to a common outlet. Similar to the Kep-O-seal® inline version, a free floating metal ball shuttles according to the relative pressure at the two inlets. The higher pressure inlet flows through the valve and moves the ball to close the opposite inlet. Kepner's *Flexible Seal Seat™* ensures bubble-tight shutoff of liquid or gas, and long service life. Shuttle valves can also flow in the reverse direction, and relieve system pressure when input is removed. Standard and specialty valves handle a wide variety of applications, and are ideal for use in manifolds, subplates, or cylinder heads.

Features and Benefits:

- *Flexible Seal Seat™* for zero leak (bubble-tight) seal at closed port
- No threaded connections (avoid potential leakage)
- Non-biased free floating shuttle ball with short travel path
- Minimal pressure differential shifting
- O-Ring positively secured
- Compact, easy installation - Accessory Kepner Holding Device Kits available

Valve Specifications:

- Sizes: 1/16 inch to 3/4 inch Nominal sizes (1.6 mm to 19 mm)
- Body Materials: Brass, Steel, 303 Stainless Steel
- O-Ring Seals: Buna-N, Neoprene, Teflon®, Viton®, EP, others available
- Temperature: -300°F to 450°F (-184°C to 232°C), O-Ring dependent
- Operating Pressure: to 3000 PSI (207 bar)
- Flow: to 60 GPM (227 LPM)

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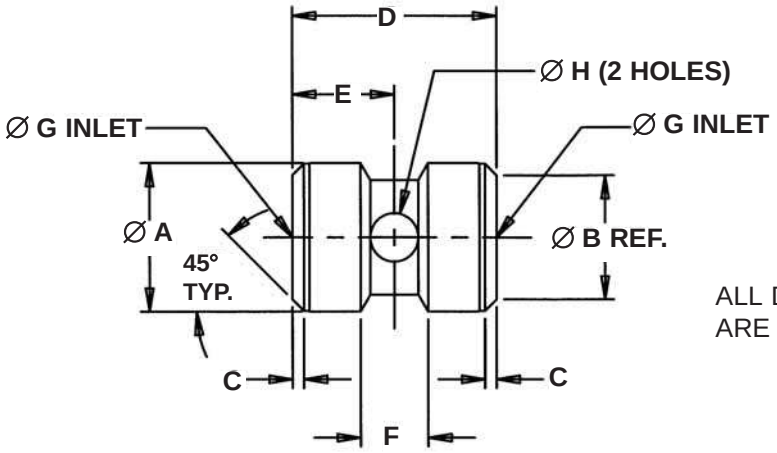
KEPNER PRODUCTS COMPANY

Cartridge Type
Insert Shuttle Valves

Dimension Diagram and Part Number:



ALL DIMENSIONS (IN INCHES)
ARE FOR REFERENCE ONLY

MODEL	A	B REF	C	D	E	F	G	H	EXTERNAL SEAL SIZE
2251	.374 / .369	.20	.08	.772 / .758	.38	.13	.09	.08	010
2253	.499 / .494	.30	.09	.887 / .873	.44	.20	.17	.13	012
2256	.686 / .681	.49	.09	1.100 / 1.086	.55	.29	.31	.22	015
2260	1.061 / 1.056	.88	.08	1.467 / 1.453	.73	.48	.53	.34	021
2262	1.311 / 1.306	1.03	.14	1.875 / 1.861	.93	.61	.66	.43	122

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PART NUMBER EXAMPLE

22 56 C - 1

BASE MODEL NUMBER

NOMINAL SIZES

51 = 1/16”
53 = 1/8”
56 = 1/4”
60 = 1/2”
62 = 3/4”

CONSTRUCTION MATERIALS

B = BRASS C = STEEL D = 303 STAINLESS STEEL

O-RING SEALS

1 = BUNA-N
6 = BUNA-N (90)
8 = VITON®
9 = NEOPRENE
25 = ETHYLENE PROPYLENE

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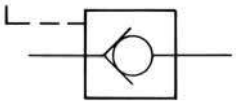
Kepsel® Cartridge Type Insert Lock Valves



The cartridge lock valves combine a Kepsēl® Cartridge Insert Check with a rugged pilot operator, and function the same as the counterpart Kep-O-Lok® inline lock valve. They free flow from valve port to cylinder port (or portion of circuit) and "lock" reverse flow until pilot pressure is applied to unlock the internal check valve and allow reverse flow. Kepner's *Flexible Seal Seat™* provides positive bubble-tight locking to prevent load drift or circuit creep, and answers the need where internal leakage could adversely affect performance such as with clamping cylinders or outrigger stabilizer jacks. Standard and specialty valve designs handle a wide variety of block and load hold applications, and are ideal for use in manifolds, subplates, or cylinder heads.

Features and Benefits:

- *Flexible Seal Seat™* for zero leak (bubble-tight) seal locking
- No threaded connections (avoid potential leakage)
- Basic pilot ratio 3:1
- Surge flow protected with calibrated pilot orifice
- Compact, easy installation - Accessory Kepner Holding Device Kits available

Valve Specifications:

- Sizes: 1/16 inch to 3/4 inch Nominal sizes (1.6 mm to 19 mm)
- Body: Steel; Pilot Piston: Stainless; Poppet, Retainer, Rod: Steel
- O-Ring Seals: Teflon® (internal check valve), Buna-N (external body chamfer)
- Temperature: -40°F to 300°F (-40°C to 149°C), O-Ring dependent
- Operating Pressure: to 3000 PSI (207 bar)
- Flow: to 40 GPM (151 LPM)

MADE IN USA

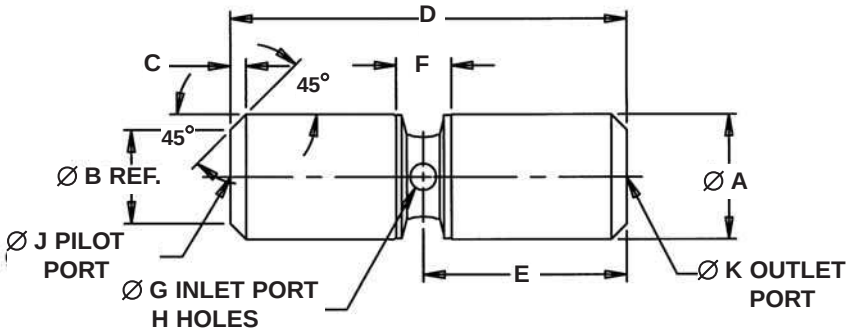
NFPA MEMBER

995 N. Ellsworth Avenue
Villa Park, IL 60181
Phone: 630-279-1550
FAX: 630-279-9669
www.kepner.com

KEPNER PRODUCTS COMPANY

Kepsel® Cartridge Type Insert Lock Valves

Dimension Diagram, Part Number and Flow Charts:



NOTES:
1. ALL DIMENSIONS (IN INCHES) ARE FOR REFERENCE ONLY
2. VALVE MUST BE HELD END FOR END IN USE

MODEL	A	B REF	C	D	E	F	G	H	J	K	EXTERNAL SEAL O-RING SIZE
2741	.374 / .369	.19	.09	1.207 / 1.192	.66	.22	.06	4	.10	.10	010
2743	.624 / .619	.44	.09	1.598 / 1.583	.84	.25	.17	2	.22	.22	014
2746	.749 / .744	.56	.09	2.406 / 2.391	1.23	.33	.16	4	.30	.33	016
2750	1.187 / 1.183	1.00	.09	2.967 / 2.952	1.59	.48	.25	4	.55	.48	023
2752	1.436 / 1.431	1.25	.09	3.929 / 3.914	1.98	.67	.31	4	.25	.61	027

PART NUMBER EXAMPLE

27 46

BASE MODEL NUMBER

NOMINAL SIZES

41 = 1/16" 43 = 1/8" 46 = 1/4"
50 = 1/2" 52 = 3/4"

CONSTRUCTION MATERIALS

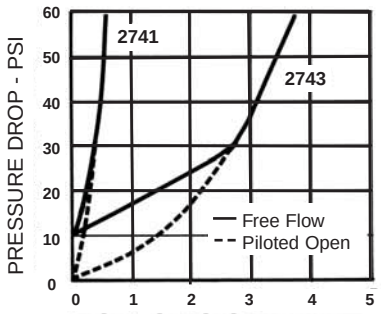
C = STEEL

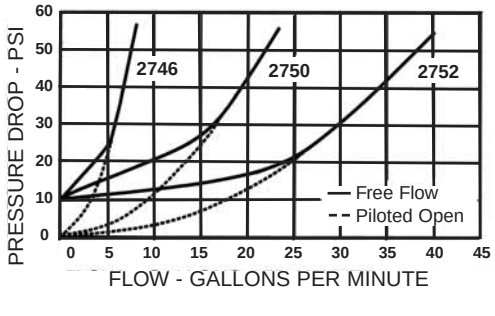
O-RING SEALS

TEFLON®

CRACK PRESSURE

10 PSI CRACK





Test Fluid: MIL-H-5606A Hydraulic Oil
Test Temp: 75° F

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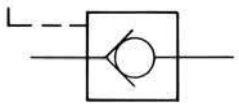
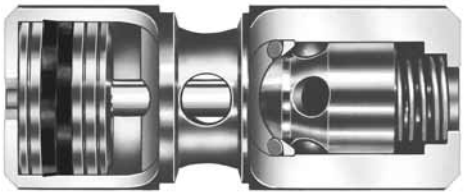
KEPNER PRODUCTS COMPANY

Kepsel® Pneumatic Cartridge Type Insert Lock Valves





The pneumatic cartridge lock valves combine a Kepsel® Cartridge Insert Check with a sealed pilot operator, and function the same as the counterpart Kep-O-Lok® inline lock valve. They free flow from valve port to cylinder port (or portion of circuit) and "lock" reverse flow until pilot pressure is applied to unlock the internal check valve and allow reverse flow. Kepner's *Flexible Seal Seat™* provides positive bubble-tight locking to prevent load drift or circuit creep, and answers the need where internal leakage could adversely affect performance such as with clamping cylinders or outrigger stabilizer jacks. Standard and specialty valve designs handle a wide variety of block and load hold applications, and are ideal for use in manifolds, subplates, or cylinder heads.

Features and Benefits:

- *Flexible Seal Seat™* for zero leak (bubble-tight) seal locking
- No threaded connections (avoid potential leakage)
- Basic pilot ratio 3:1
- Compact, easy installation

Valve Specifications:

- Sizes: 1/16 inch to 3/4 inch Nominal sizes (1.6 mm to 19 mm)
- Body: Steel; Pilot Piston: Stainless; Poppet, Retainer, Rod: Steel
- Seals: Buna-N (O-Ring on internal check valve and U-cup on pilot piston)
- Temperature: -40°F to 300°F (-40°C to 149°C), O-Ring dependent
- Operating Pressure: 1000 PSI pilot signal; 3000 PSI working pressure

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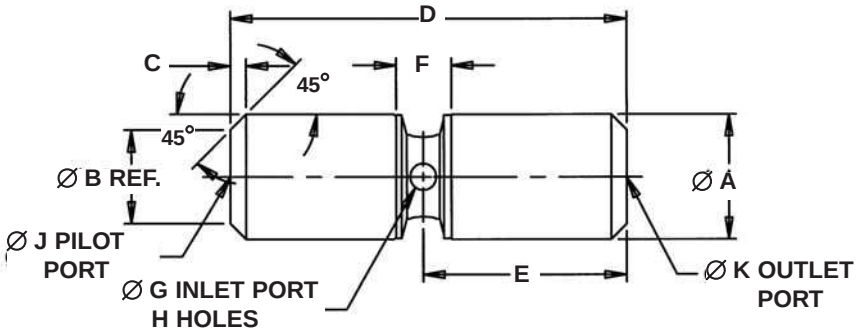
KEPNER PRODUCTS COMPANY

Pneumatic Cartridge Type Insert Lock Valves

Dimension Diagram, Part Number and Flow Charts:



NOTES:
1. ALL DIMENSIONS (IN INCHES) ARE FOR REFERENCE ONLY
2. VALVE MUST BE HELD END FOR END IN USE

MODEL	A	B REF	C	D	E	F	G	H	J	K	EXTERNAL SEAL O-RING SIZE
3541	.374/.369	.19	.09	1.207/1.192	.66	.22	.06	4	.10	.10	010
3543	.624/.619	.44	.09	1.598/1.583	.84	.25	.17	2	.22	.22	014
3546	.749/.744	.56	.09	2.406/2.391	1.23	.33	.16	4	.30	.33	016
3550	1.187/1.183	1.00	0.1	2.967/2.952	1.59	.48	.25	4	.55	.48	023
3552	1.436/1.431	1.25	.09	3.929/3.914	1.98	.67	.31	4	.25	.61	027

PART NUMBER EXAMPLE

35 46 C - 6

BASE MODEL NUMBER

NOMINAL SIZES

41 = 1/16" 43 = 1/8" 46 = 1/4"
50 = 1/2" 52 = 3/4"

CONSTRUCTION MATERIALS

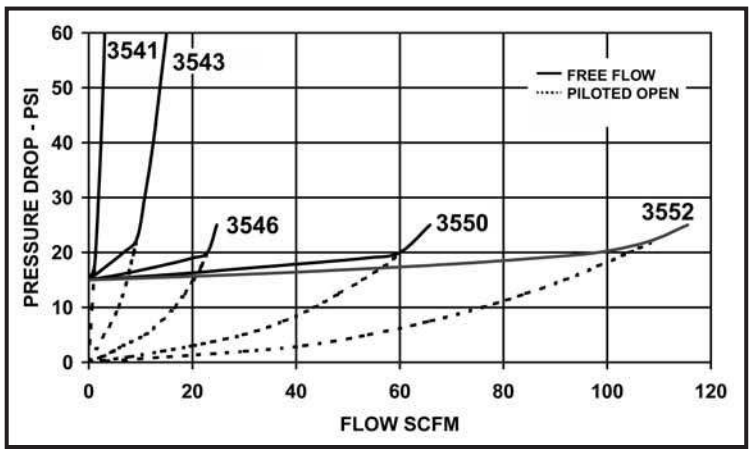
C = STEEL

SEALS

BUNA-N

CRACK PRESSURE

15 PSI CRACK



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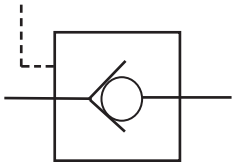
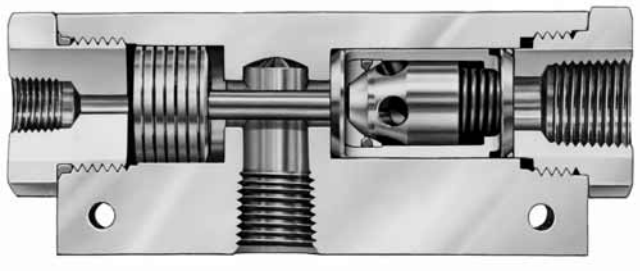
KEPNER PRODUCTS COMPANY

Kep-O-Lok® Inline Single Lock Valves





The lock valve combines a Kepsēl® Cartridge Insert Check with a rugged pilot operator. They free flow from valve port to cylinder port (or to portion of circuit) and "lock" reverse flow until pilot pressure is applied to unlock the internal check valve and allow reverse flow. Kepner's *Flexible Seal Seat™* provides positive bubble-tight locking to prevent load drift or circuit creep, and answers the need where internal leakage could adversely affect performance such as with clamping cylinders or outrigger stabilizer jacks. Standard and specialty valve designs handle a wide variety of applications for dependable position and load holding, including safety holding against line rupture or control valve leakage.

Features and Benefits:

- *Flexible Seal Seat™* ensures zero leak (bubble-tight) seal locking
- Close fitting pilot piston with pressure balancing grooves for minimal pilot loss
- Basic pilot ratio 3:1
- High strength, light weight aluminum body
- Mounting holes for installation

Valve Specifications:

- End Connections/Ports: 1/4 inch to 3/4 inch NPTF or SAE tube
- Pilot: 1/4 inch NPTF
- Body: Aluminum; Valve Module: Steel; Pilot Piston: Stainless; Port Caps: Steel
- O-Ring Seals: Teflon® (internal check valves), Buna N (cylinder/pilot port caps)
- Temperature: -40°F to 300°F (-40°C to 149°C), O-Ring dependent
- Operating Pressure: to 3000 PSI (207 bar)
- Flow: to 40 GPM (151 LPM)

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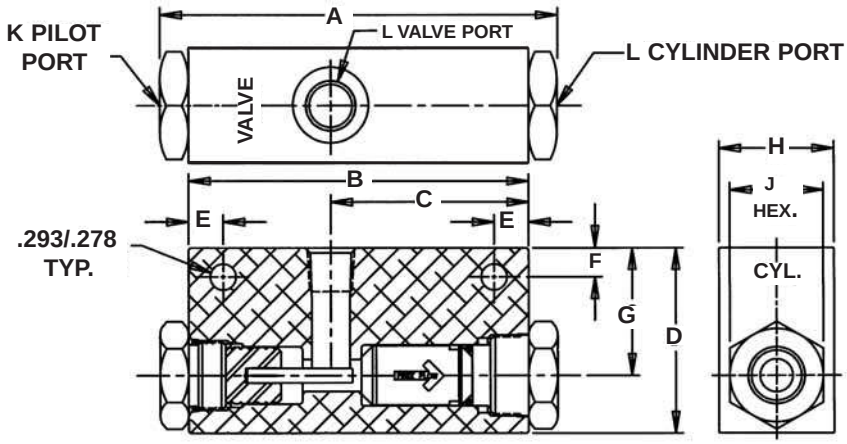
KEPNER PRODUCTS COMPANY

Kep-O-Lok® Inline Single Lock Valves

Dimension Diagrams, Part Number and Flow Chart:



Consult factory for variations or special applications.

MODEL	A	B	C	D	E	F	G	H	J HEX	K PILOT PORT	L CYL AND VALVE PORT	
										FPT	FPT	SAE
2706P2	4.32	3.69	2.14	2.00	.38	.31	1.38	1.25	1	1/4	1/4	--
2706T6										1/4	--	3/8
2710P3	5.53	4.72	2.72	2.00	.38	.31	1.25	1.50	1 7/16	1/4	3/8	--
2710P4										1/4	1/2	--
2710T8										1/4	--	1/2
2712P6	6.68	5.83	3.27	2.50	.50	.31	1.50	2.00	1 7/8	1/4	3/4	--
2712T12										1/4	--	3/4

PART NUMBER EXAMPLE

27 06P2-18

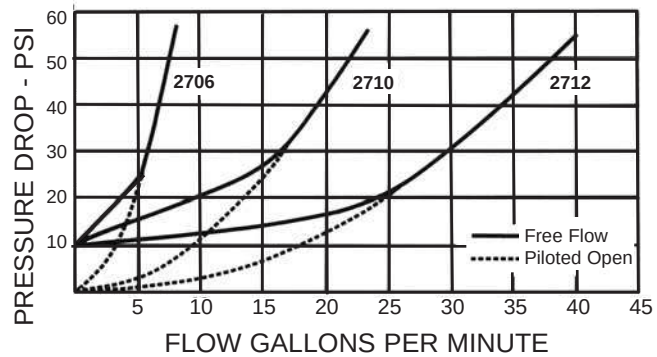
- **27** — BASE MODEL NUMBER
- **06P2** — PORT CONFIGURATIONS
- **18** — INTERNAL CHECK SEAL: TEFLON®

PORT CONFIGURATIONS

06P2 = 1/4 NPTF	10T8 = 1/2 SAE
06T6 = 3/8 SAE	12P6 = 3/4 NPTF
10P3 = 3/8 NPTF	12T12 = 3/4 SAE
10P4 = 1/2 NPTF	

END CAP SEALS

BUNA-N (STD.) 18 = VITON®



Test Fluid: MIL-H-5606A Hydraulic Oil Test Temp: 75° F

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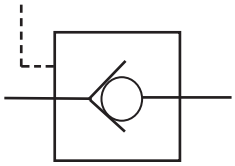
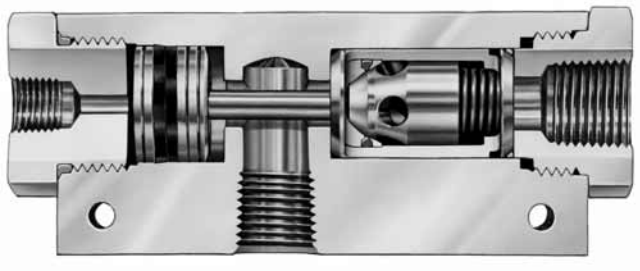
KEPNER PRODUCTS COMPANY

Kep-O-Lok® Pneumatic Inline Single Lock Valves





The pneumatic lock valve combines a Kepsēl® Cartridge Insert Check with a sealed pilot operator. They free flow from valve port to cylinder port (or to portion of circuit) and "lock" reverse flow until pilot pressure is applied to unlock the internal check valve and allow reverse flow. Kepner's *Flexible Seal Seat™* provides positive bubble-tight locking to prevent load drift or circuit creep, and answers the need where internal leakage could adversely affect performance such as with clamping cylinders or outrigger stabilizer jacks. Standard and specialty valve designs handle a wide variety of applications for dependable position and load holding, including safety holding against line rupture or control valve leakage.

Features and Benefits:

- *Flexible Seal Seat™* ensures zero leak (bubble-tight) seal locking
- Close fitting pilot piston with pressure balancing grooves for minimal pilot loss
- Basic pilot ratio 3:1
- High strength, light weight aluminum body
- Mounting holes for installation

Valve Specifications:

- End Connections/Ports: 1/4 inch to 3/4 inch NPTF or SAE tube
- Pilot: 1/4 inch NPTF
- Body: Aluminum; Valve Module: Steel; Pilot Piston: Stainless; Port Caps: Steel
- Seals: Buna-N (O-Ring on internal check valve; U-cup on pilot piston and port caps)
- Temperature: -40°F to 300°F (-40°C to 149°C)
- Operating Pressure: 1000 PSI pilot signal; 3000 PSI working pressure

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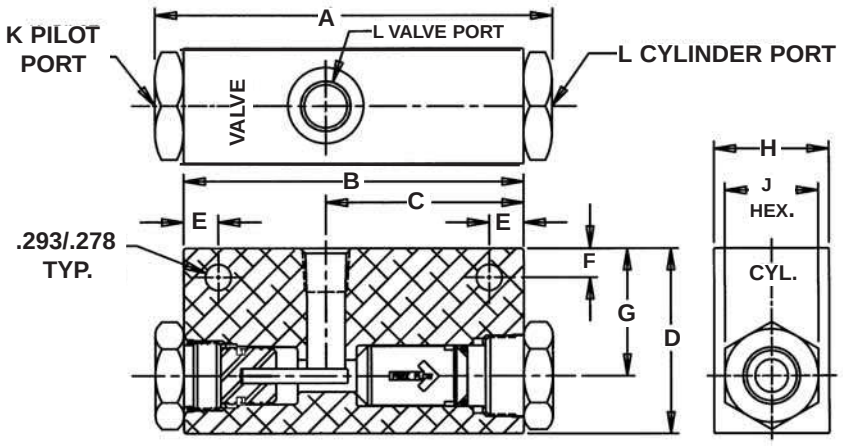
KEPNER PRODUCTS COMPANY

Pneumatic Inline Single Lock Valves

Dimension Diagrams, Part Number and Flow Chart:



Consult factory for variations or special applications.

MODEL	A	B	C	D	E	F	G	H	J HEX	K PILOT PORT	L CYL AND VALVE PORT	
										FPT	FPT	SAE
2906P2	4.32	3.69	2.14	2.00	.38	.31	1.38	1.25	1	1/4	1/4	--
2906T6										1/4	--	3/8
2910P3	5.53	4.72	2.72	2.00	.38	.31	1.25	1.50	1 7/16	1/4	3/8	--
2910P4										1/4	1/2	--
2910T8										1/4	--	1/2
2912P6	6.68	5.83	3.27	2.50	.50	.31	1.50	2.00	1 7/8	1/4	3/4	--
2912T12										1/4	--	3/4

PART NUMBER EXAMPLE

29 06P2-18

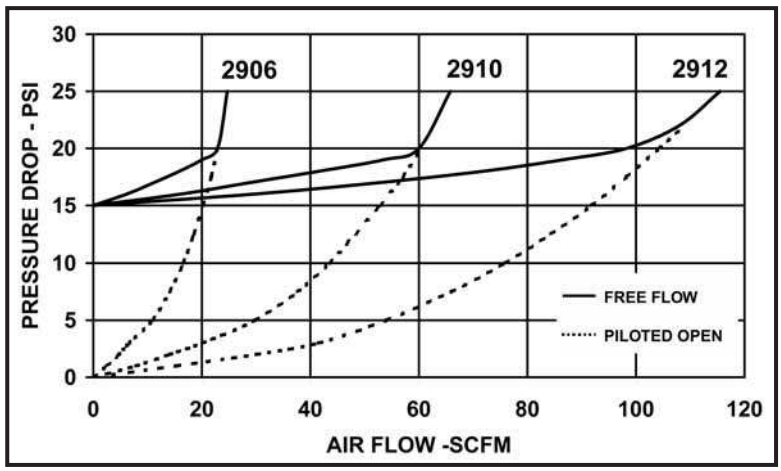
- **29** — BASE MODEL NUMBER
- **06P2** — PORT CONFIGURATIONS
- **18** — SEALS

PORT CONFIGURATIONS

06P2 = 1/4 NPTF	10T8 = 1/2 SAE
06T6 = 3/8 SAE	12P6 = 3/4 NPTF
10P3 = 3/8 NPTF	12T12 = 3/4 SAE
10P4 = 1/2 NPTF	

SEALS

BUNA-N (STD.)
18=VITON®



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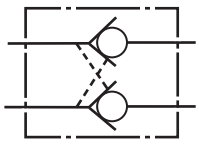
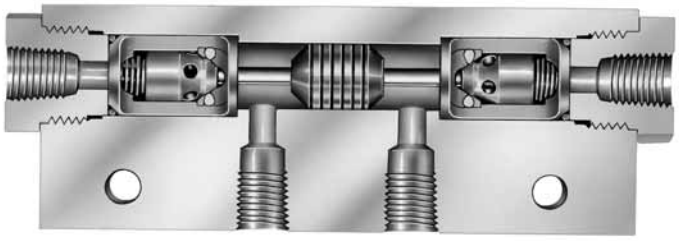
Kep-O-Lok® Inline Dual Lock Valves





These rugged valves combine two Kepsēl® Cartridge Check Valves with close fitting pilot piston shuttle to offer dependable cylinder locking in both directions. They permit free flow from valve port to cylinder port (or to portion of circuit) through one check valve while at the same time piloting open the check valve on the other side to allow reverse flow. When pressure at the valve ports is removed both check valves close and lock against movement in either direction by preventing reverse flow. Kepner's *Flexible Seal Seat™* provides positive bubble-tight locking to prevent load drift or circuit creep. Standard and specialty valve designs handle a wide variety of applications, and are commonly used with double acting cylinders for position locking and for holding against line rupture or control valve leakage.

Features and Benefits:

- *Flexible Seal Seat™* ensures zero leak (bubble-tight) seal locking both sides
- Surge flow protected with calibrated pilot orifice
- Close fitting pilot piston with pressure balancing grooves for minimal pilot loss
- Basic pilot ratio 3:1
- High strength, light weight aluminum body
- Mounting holes for installation

Valve Specifications:

- End Connections/Ports: 1/4 inch to 3/4 inch NPTF or SAE tube
- Body: Aluminum; Valve Module: Steel; Pilot Piston: Stainless; Port Caps: Steel
- O-Ring Seals: Teflon® (internal check valves), Buna N (cylinder port caps)
- Temperature: -40°F to 300°F (-40°C to 149°C), O-Ring dependent
- Operating Pressure: to 3000 PSI (207 bar)
- Flow: to 40 GPM (151 LPM)

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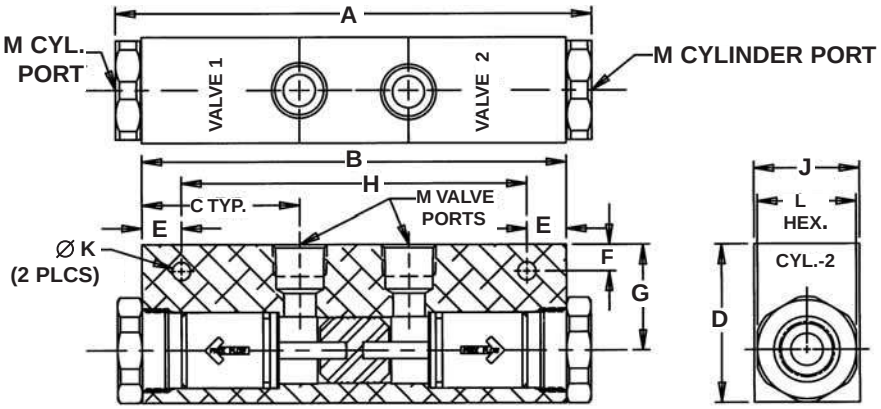
KEPNER PRODUCTS COMPANY

Kep-O-Lok® Inline Dual Lock Valves

Dimension Diagrams, Flow Chart and Part Number:



Bolt on manifold versions available to order.
Consult factory for variations or special applications.

MODEL	A	B	C	D	E	F	G	H	J	K	L HEX	M CYL AND VALVE PORT	
												FPT	SAE
2806P2	5.92	5.28	1.99	2.00	.75	.50	1.38	3.78	1.3	.35	1	1/4	--
2806T6												--	3/8
2810P3	7.41	6.66	2.56	2.50	.75	.50	1.75	5.16	1.50	.35	1 7/16	3/8	--
2810P4												1/2	--
2810T8												--	1/2
2812P6	8.82	8.06	2.99	3.00	.75	.50	2.00	6.56	2.00	.35	1 7/8	3/4	--
2812T12												--	3/4

PART NUMBER EXAMPLE

28 06P2-18

BASE MODEL NUMBER

PORT CONFIGURATIONS

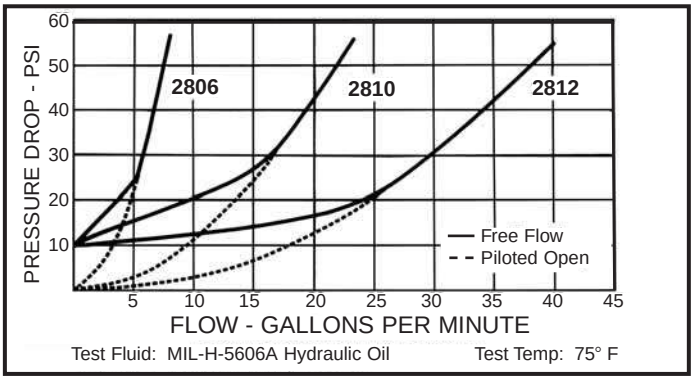
06P2 = 1/4 NPTF
06T6 = 3/8 SAE
10P3 = 3/8 NPTF
10P4 = 1/2 NPTF
10T8 = 1/2 SAE
12P6 = 3/4 NPTF
12T12 = 3/4 SAE

INTERNAL CHECK SEAL

TEFLON®

END CAP SEALS

BUNA-N (STD.)
18 = VITON®



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KEPNER PRODUCTS COMPANY

O-Ring Specification Guide

This abridged list provides seal code numbers for most of the common standard and special fluid service requirements used with Kep-O-seal valves. If your requirement is not shown, please contact the factory for a special recommendation. **New** developments in O-Ring compounds may obsolete these recommendations. It is suggested that service conditions be noted on order.

SEAL CODE NUMBER	SERVICE CONDITIONS	TEMPERATURE RANGE ºF	COMPOUND
-1	General purpose oils and lubricants, hydraulic oil, air, water.	-40 to 300 oil 250 air	Buna-N
-3	High grade exotic material for services requiring a generally inert seal material or wide temperature range.	-300 to 450	Teflon®
-6	90 Durometer Buna-N. General purpose oils and lubricants, hydraulic oil, air, water.	-30 to 275	Buna-N
-9	Refrigeration gases, (Freon 12, Freon 22), chlorine bleaching compounds - low pressure oxygen.	-45 to 300	Neoprene
-17	Military synthetic lubricants, (MIL-L-7808, MIL-L-6387, MIL-L-6085). Mil. Spec. MIL-R-7362B Specification Comp.	-65 to 300	Buna-N
-18	High grade exotic material - petroleum base fluids, many chemicals, high temperature service.	-20 to 400	Viton®
-20	Military hydraulic fluids, (MIL-H-5606). Specification Compound MIL-P-25732.	-65 to 275	Buna-N
-21	High temperature air, oxygen, etc. Consult factory for specific recommendation.	-65 to 450	Silicone
-22	Military aircraft fuels, (0 to 30% Aromatics, MIL-F-5572A, MIL-F-5642C, MIL-H-3136, RP-1), Compound MIL-P-5315A.	-65 to 200	Buna-N
-25	Steam, water, silicone oils & greases, alkalis, ketones. Excellent for Phosphate Ester base fire resistant fluids.	-70 to 400	Ethylene-Propylene
Kalrez	Excellent chemical resistance, for service in hot, corrosive environments, oil well sour gas - consult factory for availability.	to 600	Kalrez

Above data is for O-Ring only. Valve metal must also be suitable for media and temperature.

Consult Factory or Distributor for more help. Customer/user is solely responsible to select products suitable for their specific application requirements and to ensure proper installation, operation and maintenance of these products. Improper selection or use of products can cause personal injury or property damage. All sales are subject to Kepner Products Company Standard Terms and Conditions of Sale. Design subject to change without notice.

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Application and Product Suitability

The information here is provided to assist in your selection of product. For further assistance, please contact **Kepner Products Company** or visit our website **www.kepner.com.**

APPLICATION LIMITATIONS

Our products shown at this site are intended for industrial use only. Unless otherwise authorized in writing by an officer of Kepner Products Company, they should not be used in any nuclear facility or activity, aircraft/aerospace, life support, or in such other life critical applications as may require extraordinary process control.

PRODUCT SUITABILITY

The information at this site is provided to assist in the selection of product. Dimensions are for reference only and subject to change. Due to the wide variety of operating conditions and applications for our products, the customer/user, through their own evaluation, is solely responsible for final selection of product and assuring that all performance and safety requirements of the specific application are met. Kepner Products Company will provide any assistance it can regarding the selection of product.

SPECIAL/CUSTOM PRODUCTS

Besides offering a wide range of fluid control standard products, we also welcome inquiries for special/custom products and the opportunity to help in solving your specific application problems. For over half a century we have provided custom products to satisfied customers around the world. The answer to your application may already be in our files. We look forward to discussing your requirements.

Consult Factory or Distributor for more help. Customer/user is solely responsible to select products suitable for their specific application requirements and to ensure proper installation, operation and maintenance of these products. Improper selection or use of products can cause personal injury or property damage. All sales are subject to Kepner Products Company Standard Terms and Conditions of Sale. Design subject to change without notice.

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Material Selection and Safety

The information here is provided to assist in your selection of product. For further assistance, please contact **Kepner Products Company** or visit our website **www.kepner.com.**

SAFETY WARNING

Kepner standard valves are offered in aluminum, brass, carbon steel, and types 303 and 316 stainless steels. These materials have their inherent strengths and weaknesses. As such, no one material is ideal for all applications and is why we offer a choice of materials. However, making the right choice is an important matter since misuse of valve materials could cause system failure or personal injury. The customer is solely responsible for ordering suitable valve material for their application.

Some factors to consider in selecting suitable material include: its mechanical properties, corrosion resistance, the combinations of temperature and pressure that might be encountered during operation, foreseeable degradation mechanisms (such as corrosion, creep, fatigue), and the material's impact strength to handle possible surge and water hammer effects. One should also be aware of limitations on using free machining steels, such as carbon steel (12L14) and 303 stainless steel, for fatigue critical applications (cyclic loadings).. Steel additives such as sulfur, lead and selenium for purpose of improving machinability are typically present as inclusions that can lower fatigue life.

Kepner technical service experts are available to help customers with their material selection. Please contact us for assistance.

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Flow Coefficient: Cv

Flow Coefficient: Cv											
	01	**03**	**04**	**06**	**08**	**10**	**12**	**16**	**20**	**24**	**32**
Check Valve			0.54	1.3	2.3	3.4	5.9	10.1	23.4	28.7	45.6
Cartridge Check	0.17	0.7		1.4	2.4	3.7	6.3	11		26.5	43.6
High Pressure Check			0.54	1.3	2.3	3.4	5.9				
Split Flange Check							7.7	10.2	18.3	23.8	36.8
Ball Check			0.41	0.79	2.8	3.3	4.5				
Shuttle Valve			0.7	1.2	3.2	4.5	8.5				
Cartridge Shuttle Valve	0.15	0.43		1.4		4	7.9				
Single Lock Valve				1.1		3.1	5.5				
Cartridge Lock Valve	0.08	0.44		0.95		2.8	5				
Dual Lock Valve				0.95		2.8	5				
NPTF port			**1/8**	**1/4**	**3/8**	**1/2**	**3/4**	**1**	**1 1/4**	**1 1/2**	**2**
Tube port			**1/4**	**3/8**	**1/2**	**5/8**	**3/4**	**1**	**1 1/4**	**1 1/2**	**2**

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Approximate Valve Weights

		Approximate Valve Weight (lbs.)										
	Material	01	03	04	06	08	10	12	16	20	24	32
Check Valve: Models 1 & 2	Aluminum (A)			0.05	0.10	0.16	0.23	0.44	0.78	2.35	2.30	4.80
(MPT- FPT & FPT- MPT)	Brass (B)			0.16	0.29	0.47	0.69	1.29	2.25	6.85	6.82	13.60
	Steel & SS (C, D, F)			0.15	0.27	0.44	0.63	1.19	2.07	6.00	5.86	12.44
Check Valve: Model 3	Aluminum (A)			0.06	0.09	0.16	0.24	0.41	0.70	2.31	2.27	4.72
(MPT- MPT)	Brass (B)			0.16	0.26	0.48	0.72	1.19	2.17	6.74	6.70	13.37
	Steel & SS (C, D, F)			0.15	0.25	0.44	0.67	1.09	2.00	5.90	5.76	12.24
Check Valve: Models 4, 9, 11	Aluminum (A)			0.05	0.09	0.14	0.19	0.37	0.66	1.96	1.92	4.00
(FPT- FPT, FPT- Tube, Tube - FPT)	Brass (B)			0.15	0.26	0.42	0.57	1.08	1.88	5.71	5.68	11.33
	Steel & SS (C, D, F)			0.14	0.24	0.39	0.53	1.00	1.72	5.00	4.88	10.37
Check Valve: Model 5 & 7	Aluminum (A)			0.06	0.09	0.17	0.24	0.41	0.72	2.28	2.23	5.36
(MPT- Tube, Tube - MPT)	Brass (B)			0.16	0.26	0.50	0.70	1.19	2.11	6.76	6.51	15.05
	Steel & SS (C, D, F)			0.15	0.25	0.46	0.65	1.09	2.00	6.24	5.70	12.54
Check Valve: Model 13	Aluminum (A)			0.06	0.09	0.17	0.23	0.41	0.69	2.00	1.96	4.70
(Tube - Tube)	Brass (B)			0.16	0.26	0.52	0.69	1.17	1.97	5.93	5.71	13.20
	Steel & SS (C, D, F)			0.15	0.24	0.48	0.63	1.09	1.75	5.47	5.00	11.00
Check Valve: Models 15 & 17	Aluminum (A)			0.05	0.08	0.15	0.20	0.36	0.61	1.70	1.67	4.00
(Fem. Tube - Tube, Tube - Fem. Tube)	Brass (B)			0.15	0.22	0.44	0.59	1.05	1.74	5.04	4.85	11.22
	Steel & SS (C, D, F)			0.14	0.24	0.41	0.54	0.97	1.61	4.65	4.25	9.35
Check Valve: Model 19	Aluminum (A)			0.06	0.09	0.14	0.21	0.40	0.69	2.00	1.96	4.70
(Fem. Tube - Fem. Tube)	Brass (B)			0.17	0.28	0.40	0.61	1.17	1.97	5.93	5.71	13.20
	Steel & SS (C, D, F)			0.15	0.25	0.36	0.54	1.07	1.74	5.47	5.00	11.00
Cartridge Insert Check	Brass (B)	0.06	0.03		0.08	0.20	0.23	0.46	1.22		2.32	7.07
	Steel & SS (C, D, F)	0.05	0.03		0.07	0.19	0.21	0.43	1.13		2.15	6.55
High Pressure Check	Steel & SS (C, D, F)			0.25	0.51	0.54	1.10	2.05	3.80			
Split Flange Check	Steel							3.25	3.40	5.80	8.80	12.00
Ball Check	Brass (B)			0.22	0.25	0.56	0.56	1.09				
	Stainless Steel (D)			0.19	0.22	0.48	0.48	0.94				
Shuttle Valve	Brass (B)			0.50	0.50	1.44	1.44	2.50				
	Steel, SS (C,D)			0.40	0.43	1.37	1.31	2.35				
Cartridge Shuttle Valve	Brass (B)	0.08	0.10		0.13		0.25	0.44				
	Steel, SS (C,D)	0.09	0.12		0.14		0.29	0.48				
Adjustable Relief Valve	Steel, SS (C,D)					0.87						
Adjustable Cartridge Relief	Steel, SS (C,D)						0.34					
Single Lock Valve	Aluminum body				1.13		2.13	4.13				
Cartridge Lock Valve	Steel	0.14	0.18		0.25	0.66	1.38	5.00				
Dual Lock Valve	Aluminum body				1.60		3.34	6.28				
		01	03	04	06	08	10	12	16	20	24	32

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Standard Terms and Conditions of Sale

ACCEPTANCE. This writing is not an acceptance of any offer made by Buyer. All orders are subject to acceptance by Kepner Products Company (Seller) and shall be governed exclusively by the terms and conditions stated herein. Any terms and conditions in addition to, or inconsistent with those stated herein are hereby objected to by Seller. No such additional, different or inconsistent terms and conditions shall become part of the contract between Buyer and Seller unless expressly accepted in writing by the President of Seller. Seller's acceptance of any offer to purchase by Buyer is expressly conditional upon Buyer's assent to all the terms and conditions stated herein. No representative of Seller has the authority to waive, alter or add to these standard terms.

PRICE. All catalog or quoted prices and discounts are for your prompt acceptance and are subject to change without notice. Minimum order requirements apply. Each product on an order earns its own discount. However, multiple shipments of identical product scheduled to be completed within 90 days may be combined on one order for best quantity price. Prices do not include tax. Stenographic and clerical errors are subject to correction.

TAXES. Buyer shall reimburse Seller for all taxes, excises or other charges that Seller may be required to pay to any government upon the sale hereunder unless Buyer furnishes to Seller adequate proof of exemption from such taxes. Buyer shall also assume and pay any applicable import/export duties.

PAYMENT. Unless otherwise stated or agreed upon, payment in U.S. currency shall be made by Buyer thirty (30) days from the date of invoice.

CREDIT APPROVAL. Deliveries and performance of work shall at all times be subject to the credit approval of Seller, and Seller may at any time decline to make delivery or perform work, except upon receipt of payment or security arrangements satisfactory to Seller. Whenever Seller in good faith has reason to question Buyer's ability or intent to perform, Seller may demand in writing adequate assurance from Buyer of Buyer's ability or intent to perform, and may suspend performance hereunder pending such assurance. In the event that such a demand is made and such assurance is not given within a reasonable time, Seller may treat that failure as an anticipatory repudiation hereof and exercise any appropriate remedy therefor.

DELIVERY. Unless otherwise agreed upon, delivery is made F.O.B. Seller's plant in Villa Park, Illinois. Seller shall deliver product by the method according to Buyer's written instruction. All shipping costs, including freight and insurance costs, shall be borne by the Buyer. Risk of loss shall pass to Buyer upon delivery to a carrier. Delivery dates shown are approximate only and Seller will use reasonable efforts to meet them; however, Seller shall have no liability for any damages or penalties whatsoever related to delay in delivery caused by events beyond Seller's control including, without limitation, acts of God, fire, inclement weather, inability to obtain materials or manufacturing facilities, failure of shipping facilities, defaults of common carriers or Buyer's acts or omissions.

SHIPMENT CLAIMS. Any claims by Buyer for omissions or shortages in a shipment shall be waived unless Seller receives notice thereof within ten (10) days after Buyer's receipt of the shipment.

RETURN POLICY. Unused product may be returned only if authorized by Seller in writing, and its acceptance will be contingent upon inspection at Seller's plant, with shipment at Buyer's expense. Returns will not be accepted by Seller without an R.G.A. # (Returned Goods Authorization number). Returns are subject to a restocking fee, except those returns of defective product under Warranty or incorrect shipment.

LIMITED WARRANTY. Seller warrants that the products sold to Buyer shall be free from defects in material and workmanship for a period of one year after the date of Seller's delivery. If during this period, (i) Seller is notified promptly in writing of the defect, (ii) such product is returned freight PREPAID to Seller along with R.G.A. number and a complete explanation of the defect and circumstances, and (iii) Seller's examination of such product discloses to Seller's satisfaction that such product is defective and such defect is not caused by accident, abuse, misapplication or improper installation, contamination, or any tampering, repair, or alteration performed by anyone other than Seller, then Seller shall at its sole option either repair, replace, or credit the Buyer for such defective product. The forgoing warranty constitutes Seller's exclusive liability, and the exclusive remedy of the Buyer, for any breach of warranty or other nonconformity of the products covered hereunder. THIS WARRANTY IS EXCLUSIVE, AND IN LIEU OF ALL OTHER WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY EXPRESSLY DISCLAIMED. No representative of Seller has any authority to change or extend the provisions of this warranty in any manner whatsoever.

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CHANGES AND CANCELLATIONS. Acceptance of Buyer's request to modify or cancel the sale order shall be at Seller's discretion, and shall be upon such terms and conditions as Seller may require to cover incurred costs and to compensate for earned quantity discount prices.

PRODUCT WARNING. Due to the wide variety of operating conditions and applications for Seller's products, the Buyer, through its own evaluation, is solely responsible for final selection of product and assuring that all performance and safety requirements of the specific application (including physical and chemical compatibility) are met.

LIMITATION OF APPLICATION. Seller's products are intended for industrial use only. Unless otherwise authorized in writing by an officer of Seller, Seller's products shall not be used in any nuclear facility or activity, aircraft/aerospace, life support, or in such other life critical applications as may require extraordinary process control or where failure of product could cause substantial harm or damage.

COMPLIANCE WITH LAWS. Seller shall comply with the Fair Labor Standards Act of 1938 and the Equal Employment Opportunity law, as applicable and amended from time to time.

SECURITY INTEREST. Buyer hereby grants to Seller a security interest in the goods sold hereunder, until the buyer has completed payment of the purchase price, plus accrued interest, and fully performed all of the other terms and conditions hereof, at which time Seller's security interest is satisfied.

ENTIRE AGREEMENT/GOVERNING LAW. The terms and conditions herein, together with any amendments or modifications expressly accepted by Seller in writing, shall constitute the entire agreement concerning the product sold, and there are no oral or other representations or agreements which pertain thereto. If any provisions of these terms and conditions of sale shall be deemed illegal or unenforceable, such illegality or unenforceability shall not affect the validity and enforceability of any legal and enforceable provision hereof, which shall be construed as if such illegal and unenforceable provision(s) had not been inserted herein. The failure of either Seller at any time or times to enforce any provision of this Agreement shall in no way be construed as a waiver of such provision and shall not affect the right of Seller at a later time to enforce each and every such provision. This Agreement shall be governed by the law of the State of Illinois. THE RIGHTS AND OBLIGATIONS OF THE PARTIES HEREUNDER SHALL NOT BE GOVERNED BY THE PROVISIONS OF THE 1980 U.N. CONVENTION ON CONTRACTS FOR THE INTERNATIONAL SALE OF GOODS.

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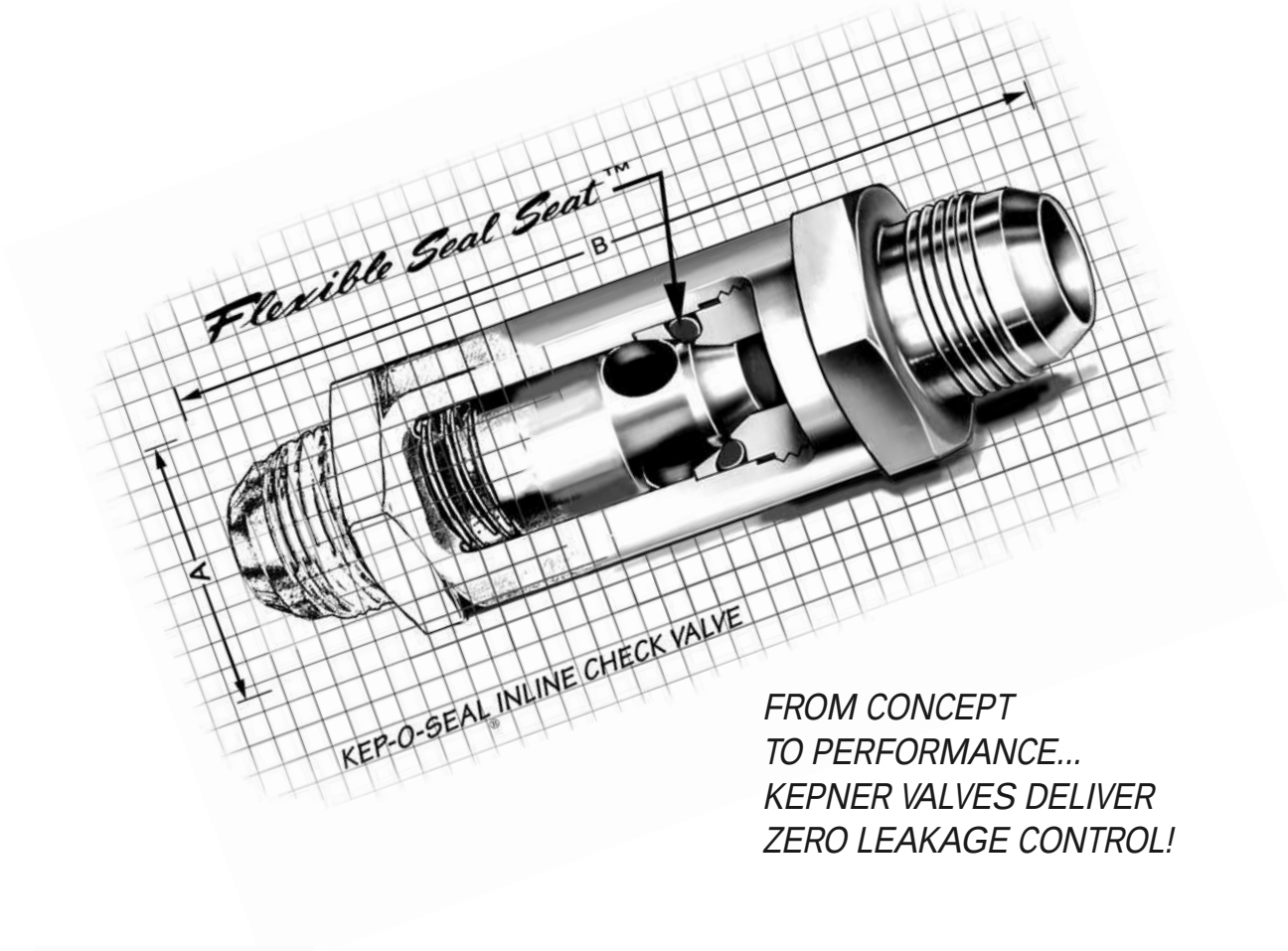
TECHNICAL CATALOG SUPPLEMENT
"TIPS AND APPLICATIONS"



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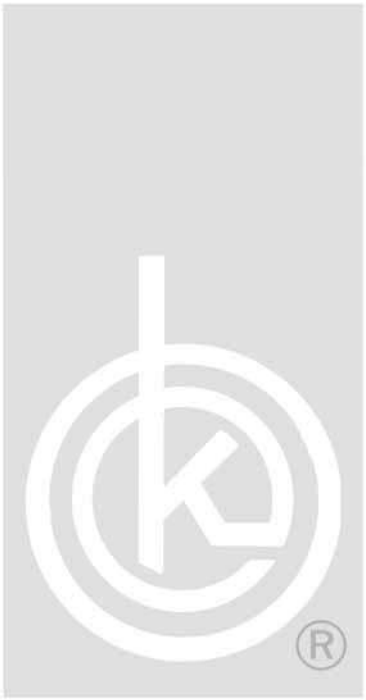

Tips and Applications - Table of Contents

The Tips sheets listed below answer many customer questions regarding our product line and offer details regarding applications, use and maintenance. If your question is not addressed by these pages, please consult the factory. Many engineering problems have been solved by experience and we may have your answers readily available.

Tips #1: Kep-O-seal® Inline Valves - Summary and Applications

Tips #2: Kep-O-seal® Inline Check Valves - **Gas Flow**

Tips #3: Measuring Surge Pressure Using An Inline Check Valve

Tips #4: Kep-O-seal® Inline Check Valve Applications

Tips #5: Relief Check Valves: Various Relief Settings

Tips #6: Adjustable Relief Valves

Tips #7: Kep-O-seal® Ball Check Valves

Tips #8: Kep-O-seal® Shuttle Valve Functions and Applications (2 pages)

Tips #9: Kep-O-seal® Fixed Orifice Flow Control Restrictor Valves

Tips #10: Kep-O-seal® Split Flange Check Valves

Tips #11: Kep-O-seal® Inline Valves - **Installation Care**

Tips #12: Check Valve Features - FAQ (2 pages)

Tips #13: Kepsēl® **Cartridge** Insert Valves - Applications and **Installation** (3 pages)

Tips #14: Kep-O-Lok® Single Lock Valves

Tips #15: Kep-O-Lok® Dual Lock Valves

Tips #16: Kepsēl® Cartridge Insert Lock Valves

Tips #17: Valve Material Selection

Tips #18: O-Ring Seal Selection Guide

Glossary

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Tips #1

Kep-O-seal® Inline Valves - Summary and Applications

Kep-O-seal® Inline Valves:
Check, Relief Check, Ball Check, Shuttle, Adjustable Relief, Fixed Orifice Flow Control Valves, Lock Valves and SAE Flange Valves are all available as inline valves.

Port configurations include the NPT and JIC, (SAE compatible), male and female combinations with sizes ranging from 1/8" pipe to 3" pipe.

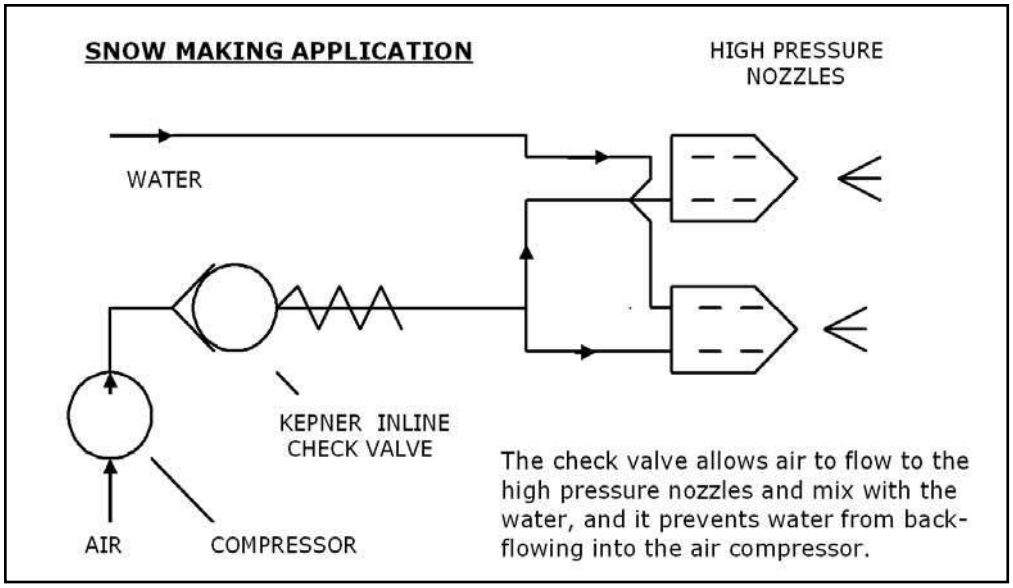
Construction materials include: aluminum, brass, zinc plated steel, 303 stainless steel and 316 stainless steel.

A variety of O-Ring seals allow for corrosive media applications and media temperatures up to 600°F. O-Ring materials include: Buna-N, Neoprene, Viton, Ethylene Propylene and Kalrez.

Crack pressures of 1 to 3 PSI are standard, and higher crack pressures (3,000 PSI) are available for relief valves. Working pressures of 3,000 PSI and higher pressure valves (6,000 PSI working pressure) are available.

Many of the Kep-O-seal® inline valves were tested in accordance with military specifications. Tests included vibration, (acceleration), temperature, high pressure and salt spray. Passing these tests required results proving that cracking pressures were maintained, no leakage resulted and no component malfunction or physical damage resulted from the tests.

Results showed that Kepner Inline Valves perform as required under adverse to severe conditions. The ultimate test is to determine the life of the valves in various critical customer applications. Kepner's valves are in service worldwide, constantly proving their exceptional durability, and consistently passing new tests verifying quality and reliability month after month and year after year. We have experience providing creative custom solutions to solve your specific application problems. Contact the factory for technical assistance not readily available anywhere else.



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Kep-O-seal® Inline Check Valves - Gas Flow

Figure 1 shows approximate airflow data for the Kep-O-seal® check valves. Airflow is plotted as standard cubic feet per minute, (SCFM), against pressure drop across the valve. This data is for low pressure conditions with the valve or flowmeter vented to atmosphere.

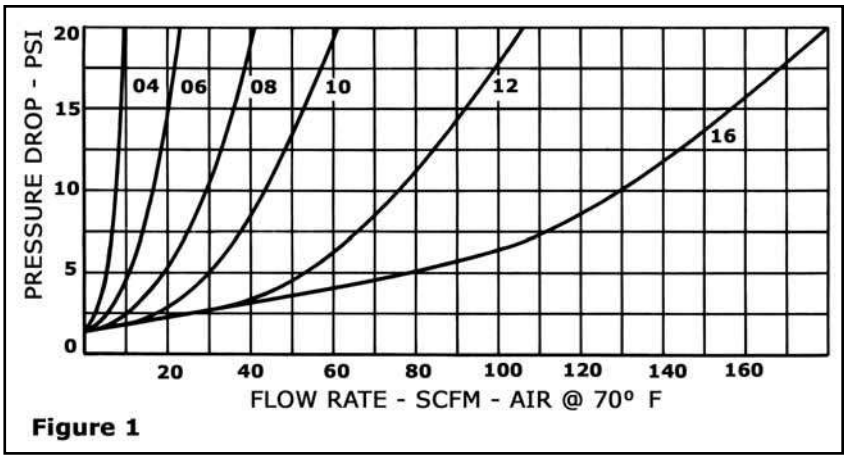

Figure 1

When dealing with a closed air system, (not vented to atmosphere), as is most often the case, the system pressure or upstream pressure is higher than atmospheric pressure thus increasing air density. In this case, the free air flow will be greater (for the same pressure drop across the valve).

Figure 2 is a correction factor curve plotted against system pressure to correct the data of Figure 1 for higher pressures. For example, with an upstream pressure of 100 psi the factor is approximately 2, which means the airflow in SCFM will be 2 times the low pressure curve data.

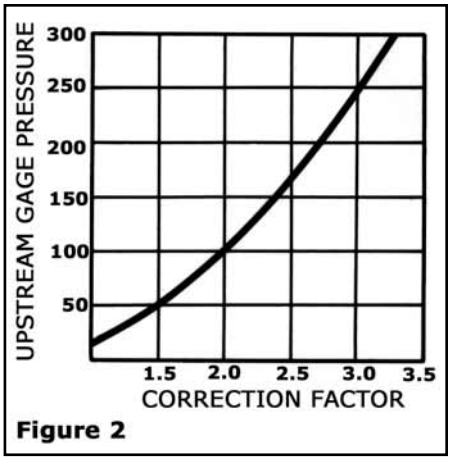

Figure 2

GAS (at standard conditions)	MULTIPLY AIRFLOW BY
Hydrogen	14
Helium	7.1
Ammonia	1.7
Nitrogen	1.04
Oxygen	.91
Propane	.64

Figure 3

Figure 3: For gases other than air, the flow in SCFM will vary inversely as the ratio of gas density to air density and the flow may be approximated from the airflow rate.

This data has been presented to provide reasonable estimates of the gas flow characteristics of Kep-O-seal® valves. The results will not be exact and should not be used in lieu of actual tests where exact data is required. The results will, however, be entirely adequate for valve sizing in a system.

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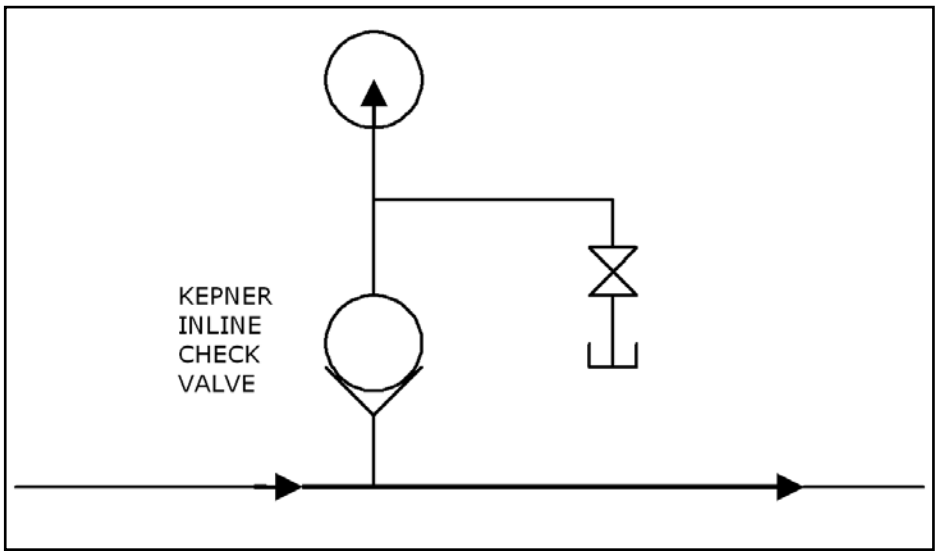
Tips #3

Measuring Surge Pressure Using An Inline Check Valve

Hydraulic equipment and circuitry develop pressure surges or shock in operation due to a rapid deceleration of the hydraulic fluid in any part of the system. The fluid deceleration may be caused by a valve closing or by a ram bottoming. Severity of shock depends on the degree of deceleration and is greatest when using fast acting on-off valves such as solenoid operated spool valves or when a fast moving ram is bottomed out such as occurs at the end of stroke on the die ram of a die casting machine.

It is often desirable and sometimes even necessary to know the magnitude of the surge. Surge and shock can be measured with an oscillograph using a high response pressure sensor, but the associated expense and inconvenience often rules this out. An ordinary pressure gage in a surging line is of no value as the gage will not respond to rapid fluctuations in pressure and the needle cannot be accurately read in its excursion up and down, even on long surges.



The simple circuit shown above is an integrator for use in cases of repetitive shock or single surges of duration within the response rate of the gage. On each successive pressure rise an increment of fluid is trapped in the gage line until the gage line pressure balances the surge pressure. When the gage reading stabilizes, the reading will be very close to the peak surge pressure.

This idea is not new and has been presented in hydraulic writings. This system, however, is accurate and usable only if a zero leakage check valve is used. The zero leakage characteristics of the Kep-o-seal® valves together with their ruggedness make them the logical choice for this application.

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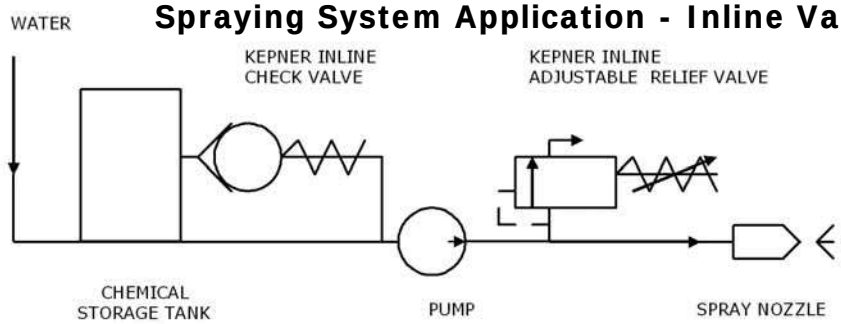
Kep-O-seal® Inline Check Valve Applications

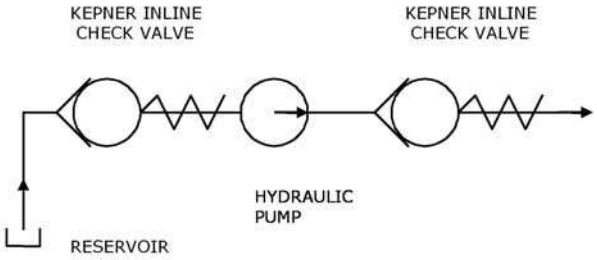
Spraying System Application - Inline Valves

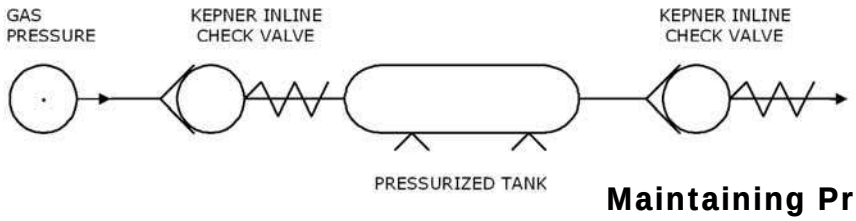


Inline Hydraulic Check Valve Application

The check valves permit flow in the direction of the arrows and prevent flow in the reverse direction.

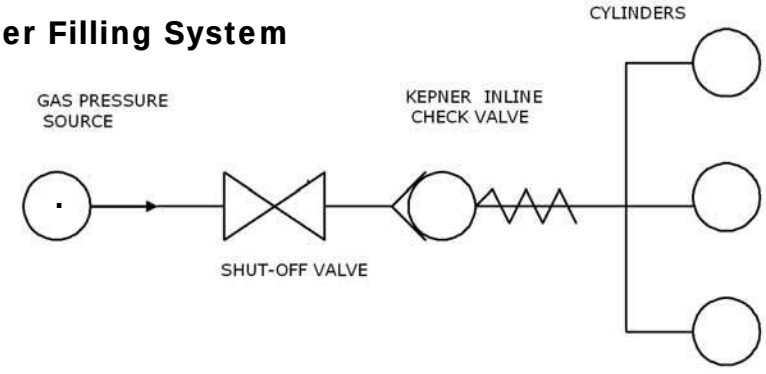
In this application the first check valve keeps the pump primed, and the second valve prevents any backflow into the pump.





Maintaining Pressure In A Tank

Gas Cylinder Filling System



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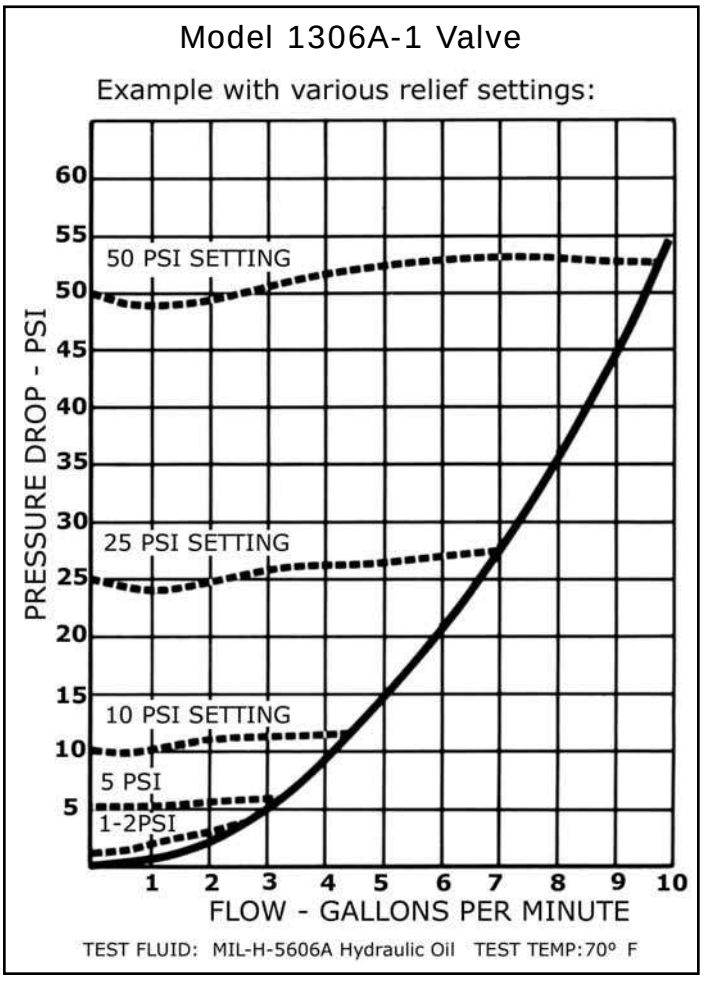
Tips #5

Relief Check Valves: Various Relief Settings

Kep-O-seal® In-line Relief Check valves and the Kepsel® Cartridge Insert valves are, by definition, check valves with cracking pressure set higher than the standard 1 to 2 PSI. This is accomplished by using stiffer springs. Our standard relief check springs are for cracking pressures of 5, 10, 25, 50 and 65 psi. Custom settings are available to 3,000 PSI on special order.

Relief Check valves are used to develop pilot pressures for pilot operated devices; to maintain controlled back pressures in tanks and supply systems; and for low pressure, high volume, relief functions such as filter bypassing.



This graph shows the flow characteristics of the 1306A-1 check valve with various preset cracking pressures. The solid curve is for the valve with spring removed and shows the basic quadratic flow profile for this valve. The dashed lines represent each different relief pressure setting. The dashed lines move horizontally to the right until they intersect the solid line and then follow the solid line upward as the flow increases.

Notice that the dashed lines are very flat and the pressure drop increase required to reach the intersection point is less than 10% at the higher pressures. It is very desirable to maintain a relatively constant pressure drop with increasing flow and we accomplish this by means of the efficient internal design, generous flow path and the use of relatively low spring rates.

This graph is typical of other valve sizes that will follow the same general trends as shown here.

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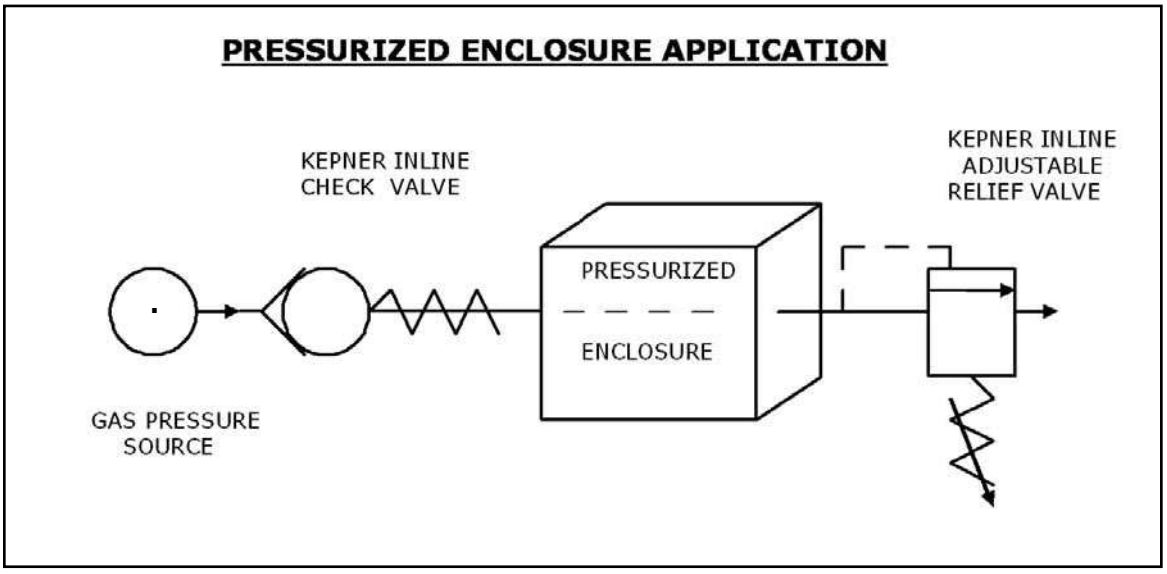
Adjustable Relief Valves

Kep-O-seal® 2300 series Relief Valves are direct operating, inline valves designed for system applications requiring fast acting pressure relief performance with tamperproof pressure adjustment and factory preset crack pressure. The three basic models incorporate springs adjustable between 50 and 2,000 PSI. The Kepsel® Cartridge Relief Valve Insert is derived from this inline valve series. The Relief Valve is built with the field proven Kepner *Flexible Seal Seat™* design providing Zero Leakage control and long service life. This has given all Kepner valves a worldwide reputation for excellence and reliability. The standard robust designs have excellent proven durability.



In this application the check valve opens causing the enclosure to be pressurized, and then closes preventing backflow out of the enclosure. The adjustable relief valve keeps the enclosure from becoming over-pressurized and thus maintains a constant pressure in the enclosure.

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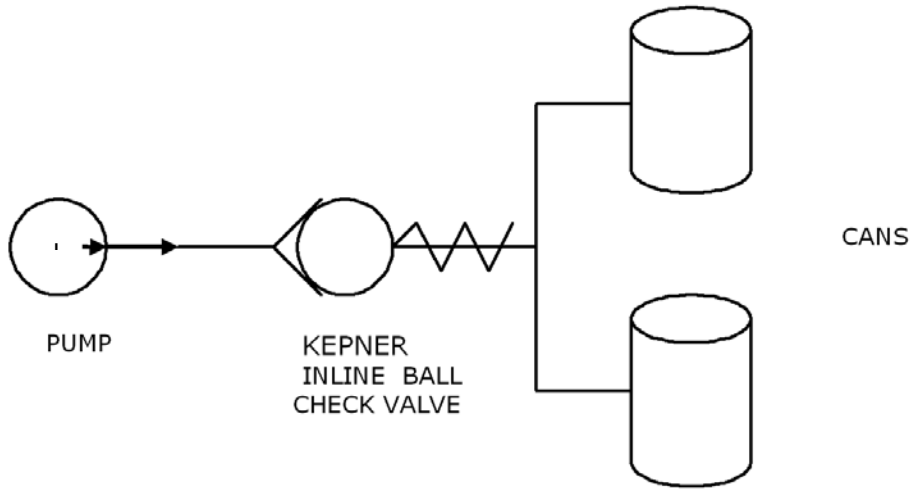
Tips #7

Kep-O-seal® Ball Check Valves

The 400 series Kep-O-seal® Ball Check Valves have large flow paths, incorporate the Zero Leakage *Flexible Seal Seat™* and have a conical tension spring. Vibration and chatter has been eliminated and the ball checks accept most contamination and high viscosity fluids. It has been designed for general purpose oils and lubricants, hydraulic oil, air and water. Rated at 3,000 PSI operation pressure, 4,500 PSI proof pressure and 1 to 3 PSI standard crack pressure, the valve is available in brass and stainless steel with Buna-N, Teflon® or Viton® O-Rings.

VISCOUS LIQUID FILLING APPLICATION



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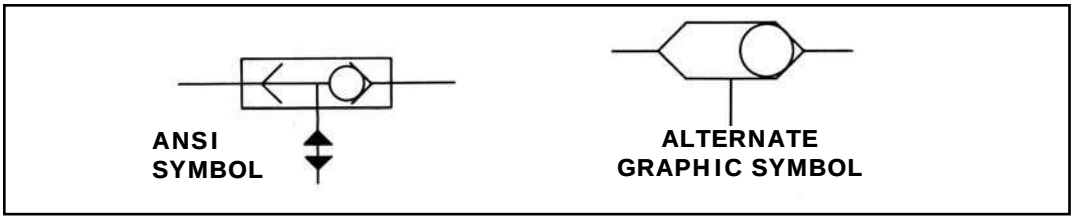
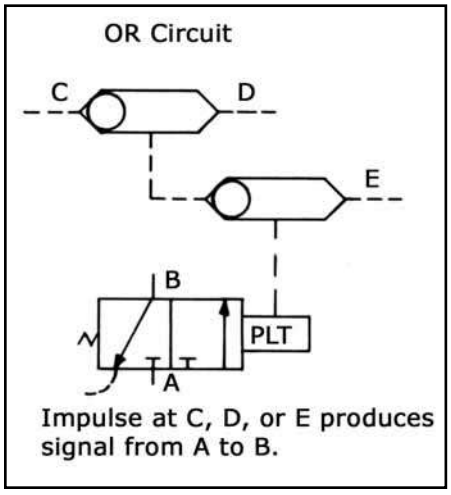
Kep-O-seal® Shuttle Valve Functions and Applications (Page 1 of 2)

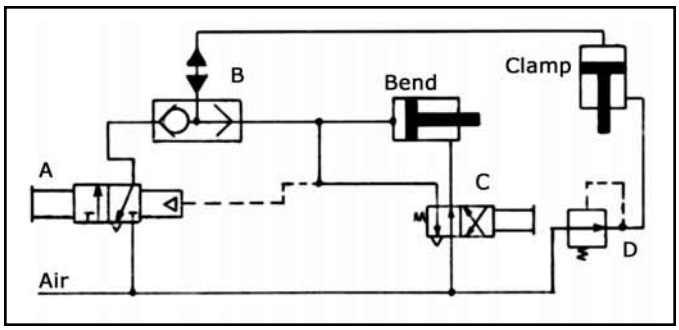
Non-biased shuttle valves are two input single output valves that are completely pressure controlled. The higher input pressure creates a pressure differential causing flow through the valve while the system pressure holds the other input port closed. The symbols shown below describe the function graphically. Shuttle valves will flow in reverse and this important characteristic distinguishes the shuttle valve from check valves placed back-to-back. In dead ended applications, such as pilot circuits and brake circuits, the system pressure must relieve when the input is removed, and the shuttle valve allows this.



FUNCTION

The shuttle valve is essentially an OR logic element. One input or the other provides the output used directly to do work or as a pilot by controlling a normally open or normally closed valve. The circuit shown is an OR circuit as the OR elements, (shuttle valves), are connected to a normally closed valve. Substituting a normally open valve, the circuit becomes a NOR circuit where any input stops the output. Shuttle valves are naturals for switching alternate, standby, emergency, pressure or power systems, and are essential for two input pilot control. The Kep-O-seal 2450 series are free ball shuttle valves with leak tight sealing on the closed port, short ball travel, and low pressure shifting, provide reliable shuttle performance at pressures to 3,000 psi. The following descriptions are some examples of shuttle valve applications. We hope these will generate additional ideas where shuttle valves may be the best choice for you.





CLAMPING AND BENDING

Valve A applies air to the up end of clamp cylinder through shuttle valve B. Operator then actuates valve C to extend the bend cylinder and reset valve A. Shuttle valve B maintains pressure in the clamp cylinder. When operator releases valve C, low pressure air from reducing valve D retracts the clamp cylinder. The pilot line of valve A is vented, and the system is ready for the next operation.

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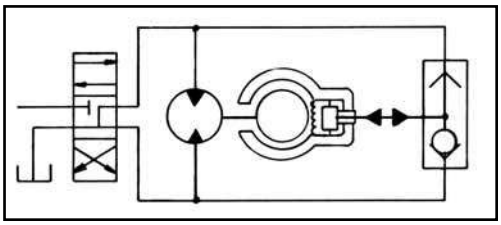
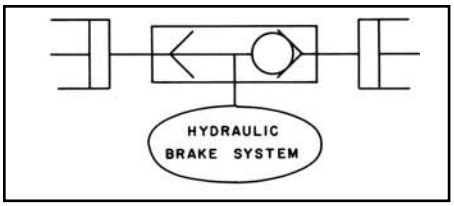
Tips #8-2

Kep-O-seal® Shuttle Valve Functions and Applications (Page 2 of 2)

WINCH BRAKE CIRCUIT

The shuttle valve provides brake control in this hydraulic winch application. When the fluid motor is energized in either direction, the shuttle valve directs fluid to open the brake shoes. When the control valve is centered, the brake cylinder is vented through the shuttle valve and the brake shoes allowed to close.



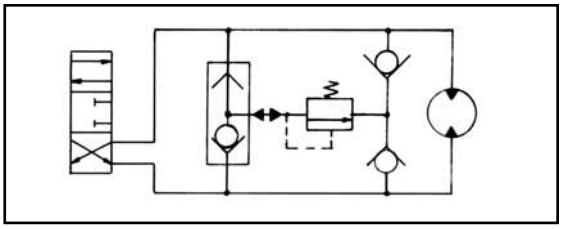


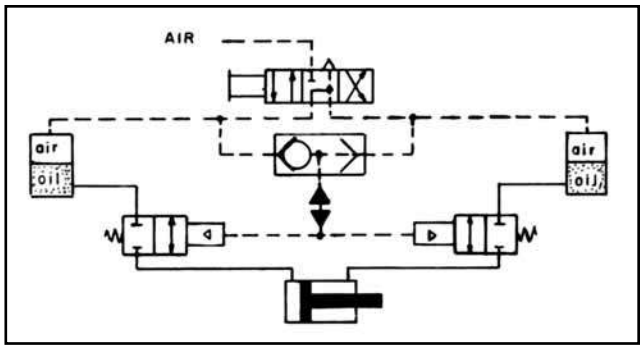
ALTERNATE POWER INPUTS

The shuttle valve allows instant change of control from one station, or master cylinder, to the other. Many vehicles and systems are equipped with alternate control stations, or two driving stations with separate hydraulic inputs. These are directed by the shuttle valve to the required output.

FLUID MOTOR CROSSOVER CIRCUIT

In this brake and crossover circuit the shuttle valve separates the high and low pressure legs and directs fluid to the relief valve. The shuttle valve replaces back-to back check valves in this application.

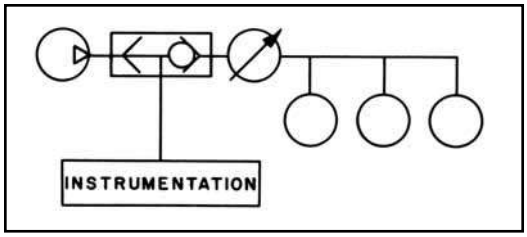




AIR PILOT CONTROL

Converting from air to oil permits locking of the cylinder. Shifting the 4-way to either extreme position applies pilot air through the shuttle valve to hold the two air-operated valves open and apply oil under air pressure to the corresponding side of the cylinder. Positioning manual valve to neutral exhausts pilot pressure closing the 2-way valves and trapping oil on both sides of the cylinder to lock it in position.

STANDBY AND EMERGENCY SYSTEMS



Compressor systems requiring standby or purge gas capability are pressure controlled by the shuttle valve. This would be for instrumentation, pressurized cables, or any system requiring continuous pneumatic input. If the compressor fails, the standby bank (regulated to slightly under compressor supply) will shift the shuttle valve and take over the function. The shuttle valve will close the compressor inlet port preventing loss of system pressure. When compressor pressure is reestablished, the shuttle valve shifts back and seals off the standby system until needed again.

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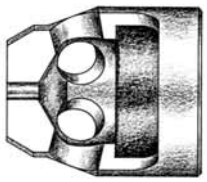
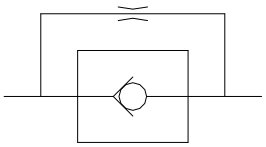
Kep-O-seal® Fixed Orifice Flow Control Restrictor Valves

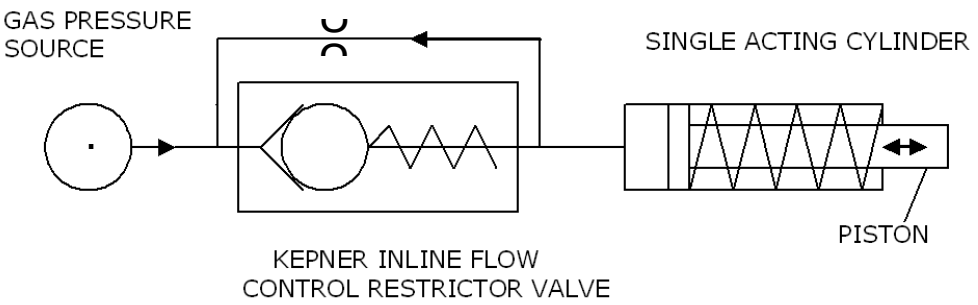
Fixed Orifice Flow Controls provide full flow in one direction and restricted (metered) flow in the reverse direction. They are standard Kep-O-seal® Check Valves or Kepsēl® Cartridge Valves equipped with a calibrated orifice drilled through the valve poppet nose. Such valves are often used in charging lines for cylinders, containers or accumulators where the designer wishes to complete the charge as rapidly as possible and then bleed back the charged fluid at a pre-determined rate.





ANSI SYMBOL

FLOW CONTROL RESTRICTOR VALVE APPLICATION



Differential gas pressure across the inline flow control restrictor valve causes gas to flow through the check valve portion of the valve causing the piston in the single acting cylinder to move to the right. As the pressure is reduced, flow through the restrictor portion of the control valve continues allowing the piston in the cylinder to move to the left at a pre-determined rate based on the size of the restrictor orifice and the piston spring force. The piston retracts (moves to the left) until it returns to the original position.

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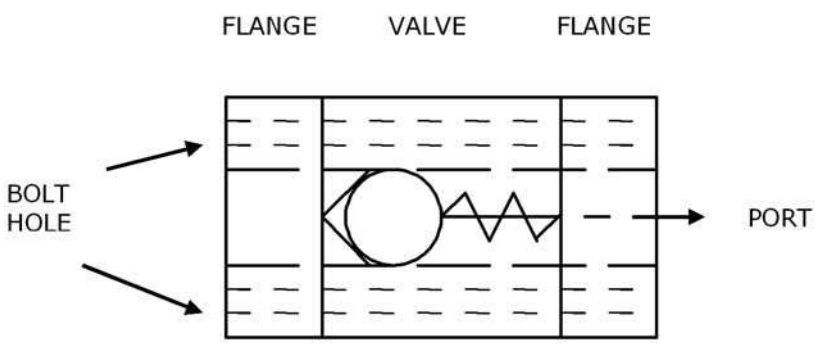
Tips #10

Kep-O-seal® Split Flange Check Valves

Kep-O-seal® 2600 series Split Flange Check and Relief Check Valves are designed to be compatible with SAE J518 4-bolt split flange connections and Code 61 mounting. This mounting system makes these valves ideal for rugged applications where threaded end connections are either impractical or inconvenient. Lack of threaded connections also allows for easy installation or removal of the valve without disturbing system lines. SAE mounting flanges bolt on pumps and motors or bolt together with other flange valves. Flange adapters permit ports to be closer to one another, and give the designer improved capabilities providing more compact components and thus aiding system integration.

Kep-O-seal Split Flange Valve



The internal components of the SAE Split Flange Valves utilize the field proven *Flexible Seal Seat™* design providing Zero Leakage control and long service life that has given all Kepner valves a worldwide reputation for excellence and reliability. Standard robust designs have excellent proven durability. The shoulder machined into the body of the valve provides a solid metal stop to prevent the poppet from bottoming out on the spring ensuring surge protection. The large holes in the poppet provide a streamlined, obstruction-free passage for efficiently handling high flow rates.

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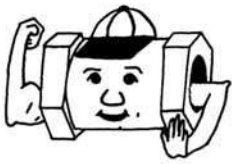
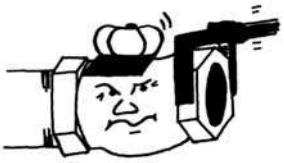
Kep-O-seal® Inline Valves - Installation Care

Kep-O-seal® valves are high grade, precision mechanisms and will perform admirably if properly handled and installed. A few minutes of care initially will assure zero leakage and trouble free service. Here we illustrate a few reminders of preferred procedure. Proper specification and installation is the customer's responsibility.



Handle with care - Kep-O-seal® valves are rugged, can stand hard use and much abuse - but precision threads can be damaged. Keep threads protected until time of installation and don't poke anything into valve from either end. Do not drop.



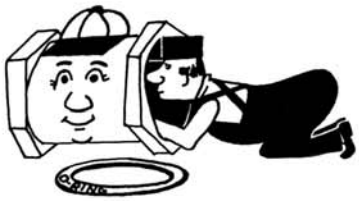
Double wrench on assembly and disassembly. Always use the hex closest to connection to prevent body distortion or inadvertent dis-assembly of valves.

Beware of chips - Pipe, tubing and valve ends must be clean. System contaminants in any valve can foul or erode valve seats and cause leakage. Back Flush systems before putting in service when ever possible. Install screens or filters where required to protect valves. Debris can prevent the valve from sealing properly, causing it to stick in the open or closed position.

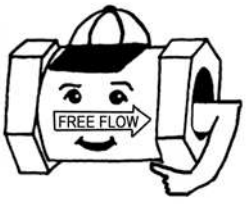
Pipe Dope goes on male threads carefully, so none gets in valve and system. Strings of tape type sealants can also foul valve seats. Good connections and proper seals prevent leakage.

Proper support will prevent strain and distortion due to sagging pipe. Hangers and supports should be close enough and properly aligned.

Shock surges and vibration can induce stresses of great magnitude on internal components and end connections. They should be avoided if possible. Again, the proper use of de-surgers, hangers and supports will lengthen the service life.



Check identification to make sure valve is correct model, of proper material, with specified O-Ring and correct spring setting to insure the valve meets your defined requirement.



Flow Arrows - Install all valves with the arrow pointed in the direction of flow. Verify flow is correct by making sure valve opens in the direction of flow. From the closed position, the poppet moves away from the seat in the direction of flow.

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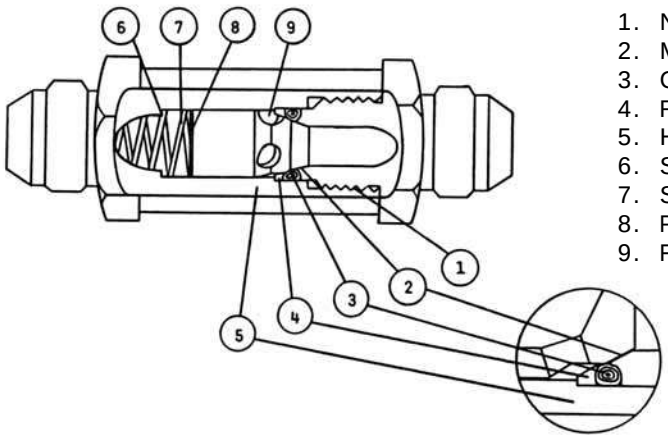
Check Valve Features - FAQ

Kepner Products Company has always stressed the Zero Leakage feature in the valves we manufacture. But, it is by no means the only benefit Kepner valves provide. To explain the other main features in the Kepner Check Valve design, we are providing the answers to frequently asked questions.



1. Non-pressurized threads
2. Metal-to-metal seat
3. O-Ring
4. Retainer
5. Heavy metal wall sections
6. Shoulder
7. Spring
8. Poppet
9. Flow holes

Q: With the poppet striking the O-Ring, doesn't the O-Ring wear out quickly?

A: No, because the *Flexible Seal Seat™* design allows the poppet to impact only slightly on the O-Ring in the closed position. The metal-to-metal contact between the poppet and end cap serves as a mechanical seat. Under reverse pressure, the O-Ring simply flexes just as much as is needed to seal around the nose of the poppet and foreign particles on the poppet. As a result, the O-Rings have been proven to have long service life.

Q: What keeps the O-Ring from being forced downstream at high pressures and under surge conditions?

A: The retainer, in conjunction with the body and end cap, holds the seal in place and prevents fluid flow from getting behind the O-Ring to dislodge it. Therefore, the O-Ring is protected from the possibility of being forced out during surge flow conditions.

Q: What O-Ring seal compounds can Kepner provide?

A: Virtually any compound necessary to insure fluid compatibility. Our standard seating material is Buna-N, (Nitrile), but we also stock compounds as listed in the O-Ring Seal Selection Guide, (Tips: #17). If a customer requires a material other than those listed, it can generally be supplied, (i.e., Kalrez, Polyurethane, etc.), since, in most cases, tolerances are within standard commercial O-Ring sizes. Kepner Products Company does caution, however, that only high quality O-Rings be used as replacements, because even small irregularities, such as flashing, will affect the operation of the *Flexible Seal Seat™* design.

Q: Your standard cracking pressure is 1-2 PSI. Can you supply other cracking pressures?

A: Yes. Our Relief Check Valve line offers standard cracking pressures of 5, 10, 25, 50 and 65 PSI by simply replacing the spring in a check valve with another precisely calibrated stock spring. Custom settings up to 3,000 PSI are also available in most sizes.

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Check Valve Features - FAQ (Page 2 of 2)

Q: How does media flow through Kepner valves?
A: The five large flow holes in the poppet cone are positioned to provide a stream lined flow path through the valve. The combined area of these holes is always greater than the area of either the inlet or outlet ports. Also, the flow is directed through the center of the spring, not through the coils, so that as the spring compresses the flow is not hampered.

Q: What has Kepner included in its design to accommodate surge flows?
A: The design has a number of features which protect Kepner valves under most surge conditions. First, as previously discussed, the O-Ring is protected from being severely impacted or extruded. Secondly, the design includes a shoulder machined into the body of the valve. This provides a solid metal stop to prevent the poppet from "bottoming out" on the spring. The spring itself is made of extra heavy wire with many turns to provide a low spring rate to minimize increase in back pressure with increased flow. Kepner valves incorporate the strength and durability needed to withstand most surge conditions.

Q: What materials do you use in making your valves?
A: Standard construction materials are Aluminum, Commercial Brass, Zinc Plated Steel, Type 303 and 316 Stainless Steel. All components in a particular valve, except the spring and O-Ring, are made of the same material unless otherwise specified. Consult factory for availability of other materials.

Q: Do you give valves made of aluminum or brass lower pressure ratings?
A: No. Not only does the seal flex around the poppet, but it also flexes to prevent external leakage. This keeps the end cap threads from becoming pressurized and thus prevents high stress in this vulnerable area. *The Flexible Seal Seat™* design also allows for heavy metal wall sections where internal pressures are the greatest. This gives added strength where it is needed most.

Q: Into which industries can Kepner valves be sold?
A: The wide variety of construction materials, sealing compounds, sizes and connection combinations allow Kepner valves to be utilized in any industry requiring check valves. Our products have been used successfully in a broad variety of applications in multiple industries from agriculture to aero-space; road equipment to robotics; industrial machinery to medical equipment; instrumentation and controls to chemical processing and handling. Consult the factory for any restrictions in hazardous applications such as nuclear, aircraft or life support applications.

Q: How do Kepner Valves compare in value to competitors?
A: Very favorably. There are valves that are less expensive, but they cannot begin to approach the quality and performance of Kepner valves. Valves with similar features tend to cost more. If a customer wants a quality product that will provide leak-tight control; good repeatability; long service life; dependability and a wide choice of configurations, Kepner valves provide the most value on the market.

Kepner valves are first in 'Zero Leakage' liquid and gas control and offer superior performance in rugged and ultra-sensitive applications. More than 60 years of service to this industry and continual refinement of Kepner valve products are your assurance of the best in performance, quality and dependability.

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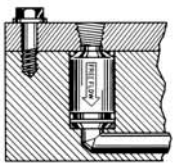
Tips #13-1

Kepsēl® Cartridge Insert Valves Applications and Installation (Page 1 of 3)

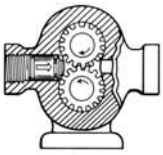
Kepsēl® Cartridge Valves are valves without an integral housing, essentially bodiless, because they consist of only the internal moving elements of the valves. They are unsupported until they are installed by insertion into a cavity with appropriate flow passageways, so as to perform the same way as a conventional valve. The cartridge must be held end-for-end in use and should not be allowed to shuttle back and forth in the cavity. The unsupported cartridge valve assembly is not intended for high pressure applications. An interference fit is required except for very low pressure applications. When properly contained, the cartridge valve will perform according to specifications. We have many successful cartridge applications at pressures up to 16,000 PSI which are dependent on the strength of the method of containment.



Kepsēl in manifold block held by cover plate. O-Ring body seal can be mounted at either end of cartridge.

Kepsēl Cartridges are ideal for sub-plate mounts and manifold block assemblies where they can be held in by other system components.

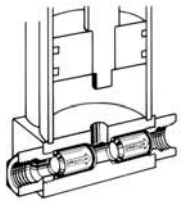
Our customers are among the best engineers and designers in the world, and they are continually devising new ways to use and adapt our cartridges to their equipment. The Kepsēl® Cartridge Insert Valve has gained acceptance because of its performance, reliability, flexibility and ease of use. It offers endless possibilities for design simplifiction and miniaturization of fluid power circuits.



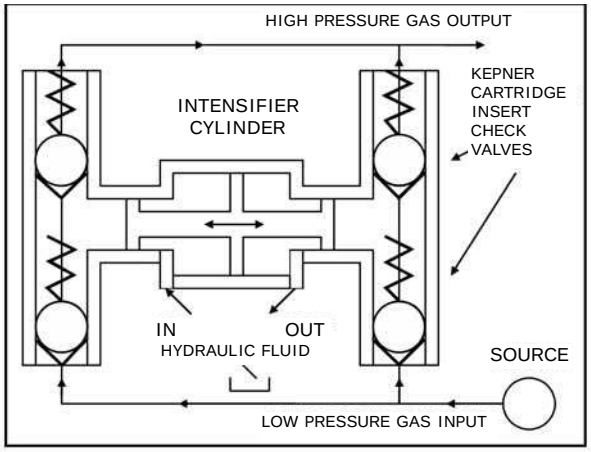
Kepsēl cartridges, with their low pressure drop, can be mounted in pump suction inlets as shown - eliminates priming.

Kepsēl® Cartridges are used as check valves, relief checks, orifice checks, shuttle, pilot operated checks and even two-way valves. They are used in control panels, manifolds, sub-plates, valve housings, pump housings, in actuator pistons for cushioning and in actuator cylinders for cushioning, speed control and valving.

The Kepner Kepsēl® Cartridge Type Check Valve is designed for simplicity of installation and positive performance. It will eliminate many maintenance problems of the product in which it has been installed. With the Kepsēl® there is no need for expensive machining and finishing of fine, close tolerance, metal surfaces. The unique *Flexible Seal Seat™* assures positive valve action with extremely long life. Dirt can't hurt it...The Kepsēl® Cartridge is designed and manufactured to the same high quality standards established by the outstanding Kep-O-seal® valve line.



Kepsēl cartridge in cylinder - pump conversion held by straight thread fittings. O-Ring body seal at inlet chamfer.



KEPSĒL® CARTRIDGE INSERT CHECK VALVE APPLICATION

The intensifier converts low pressure gas to high pressure gas. There are two cartridge insert valves used in the inlet ports and two in the outlet ports. A common rod connects the pistons of two cylinders of differing bore sizes. The smaller piston generates a greater force that translates into a higher pressure.

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Kepsēl® Cartridge Insert Valves Applications and Installation (Page 2 of 3)

External sealing of the cartridge in the cavity is accomplished by an O-Ring, and the clearance in the cavity must be within standard static O-Ring tolerances. The cartridge dimensions are such that standard drill and ream sizes, (cavity "Diameter"), in the chart below insure these tolerances are provided.

Recommended Valve Cavity For Cartridge Valves

Valve Family	Valve Number	Diameter	Dia. Tolerance	Valve Length*
Check and Relief Check Valves	2201	0.312	+0.002	0.620
	2203	0.500	+0.002	0.835
	2206	0.656	+0.002	1.215
	2208	0.813	+0.002	1.490
	2210	1.000	+0.002	1.545
	2212	1.219	+0.002	1.930
	2216	1.688	+0.002	2.615
	2224	2.313	+0.002	3.244
	2232	3.313	+0.002	4.495
Shuttle Valves	2251	0.375	+0.002	0.758
	2253	0.500	+0.002	0.873
	2256	0.688	+0.002	1.086
	2260	1.062	+0.002	1.453
	2262	1.313	+0.002	1.861
Adjustable Relief	1354	1.000	+0.002	2.151
Lock Valves	2741	0.375	+0.002	1.192
	2743	0.625	+0.002	1.583
	2746	0.750	+0.002	2.406
	2750	1.189	+0.002	2.967
	2752	1.438	+0.002	3.929

*Clamping device must allow for this valve length or longer.

The resulting tolerance between cartridge and bore will be proper to adequately maintain the leak tight seal and retain the external O-Ring against extrusion. With cavity sizes of one (1) inch or less, a drilled hole is satisfactory for pressures under 500 PSI.

The external seal may be used at any one of three positions; at either end on the chamfer or in the body groove. This provides flexibility in installation. The chamfers are often used because of ease of assembly by merely placing the O-Ring in the bottom of the bore and putting the cartridge in behind it.

If service conditions require a non-standard internal seal, the external seal should be made from the same material as the internal seal so the entire installation is compatible with the fluid and temperature.

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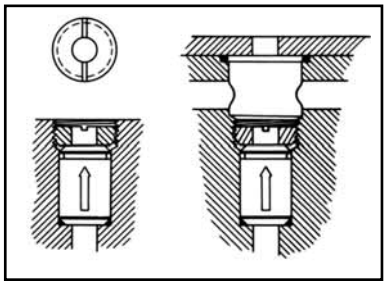
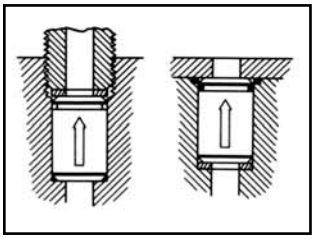
Kepsēl® Cartridge Insert Valves
Applications and Installation (Page 3 of 3)

RETAINING METHODS

(Some suggested methods of retaining the cartridge are shown here.)

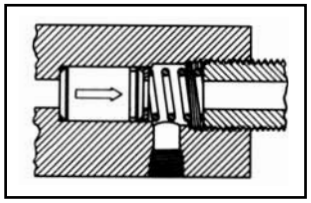


Threaded Washer: A threaded washer, as depicted here, screwed tight against the cartridge, is one of the most effective methods of providing end-for-end holding of the cartridge. The cartridge bore is drilled or reamed and then followed with the tap drill and tap. The washers can be made from rod, threaded stock, pipe plugs, or hex head set screws. A screwdriver slot or spanner wrench holes provides means for tightening. The threaded washer also makes for a very simple cross-hole installation as shown in the sketch.

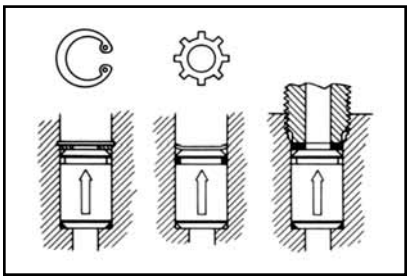


Shims - With closure by manifold cover plate, shims at top or bottom of cartridge allow exact dimensional adjustment so cover can be pulled tight and end-for-end holding accomplished together. Especially recommended for large sizes and severe operating conditions. Shims may be solid, built up, or of laminated stock peeled to fit.

Malleable Washer - A malleable copper or aluminum washer may be used as a spacer to achieve a firm hold and allow some adjustment for tolerances by squeezing.



Heavy Spring - A very heavy spring or die spring is especially effective in cross-port mounting as shown in the sketch. It is useful anywhere there is room for it, because it allows maximum tolerance on cartridge port depth. The only limitation here is that the spring be located on the downstream or outlet end of the cartridge so that, when the cartridge is checking reverse flow, it will bear against the solid end of the bore.

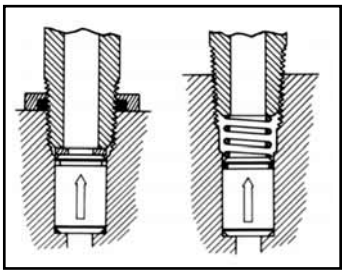


Special Applications - In this illustration, we show three commonly used methods of cartridge retainment:

Snap Ring - very strong and permits easy removal, but has the single limitation of requiring accurate positioning of the snap ring groove to provide end-for-end holding.

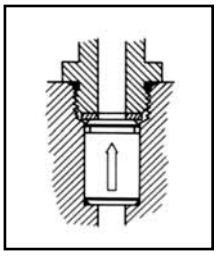
Friction Ring - the simplest means of retaining in a bore for low or medium pressures. The ring is merely pressed in tightly over the cartridge. The ring, if properly seated, will not loosen and cannot be backed out of the bore.

Teflon Washer - for low pressure applications is a relatively simple and flexible crush washer.



Fitting Closure - It is often convenient to retain the cartridge with a pipe thread, pipe fitting or tube fitting end. This requires some considerations in dimensioning the cartridge bore depth.

Pipe Threads - With pipe threads there is no control dimension to work from since the threads seat by taper interference. In this case a teflon insert lock washer, (such as Tru-Seal), may be used effectively. The hole depth is made such that the fitting contacts the cartridge as the threads begin to lock up. The final sealing is accomplished by tightening the lock washer. The malleable washer shown is necessary only if radial positioning of an elbow or tee fitting is required. Also shown here is the use of a short heavy spring between pipe thread and cartridge.



Straight Thread Port - SAE or AND 10050 - If a straight connector fitting or reducing bushing is used to close the port, the body hex is integral and must be turned in tight to seal the fitting O-Ring into the port. A malleable washer may be used as a spacer to provide for tolerance buildup from the bore depth, the cartridge and the fitting. With an elbow or tee fitting, the locknut on the body threads provides the length adjustment for proper makeup. If it is necessary that the fitting be aimed in a certain direction, a malleable washer used between fitting and cartridge should permit enough turning to properly position the fitting.

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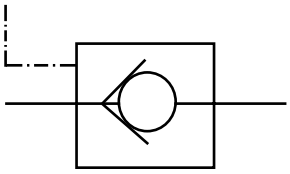
Kep-O-Lok® Single Lock Valves

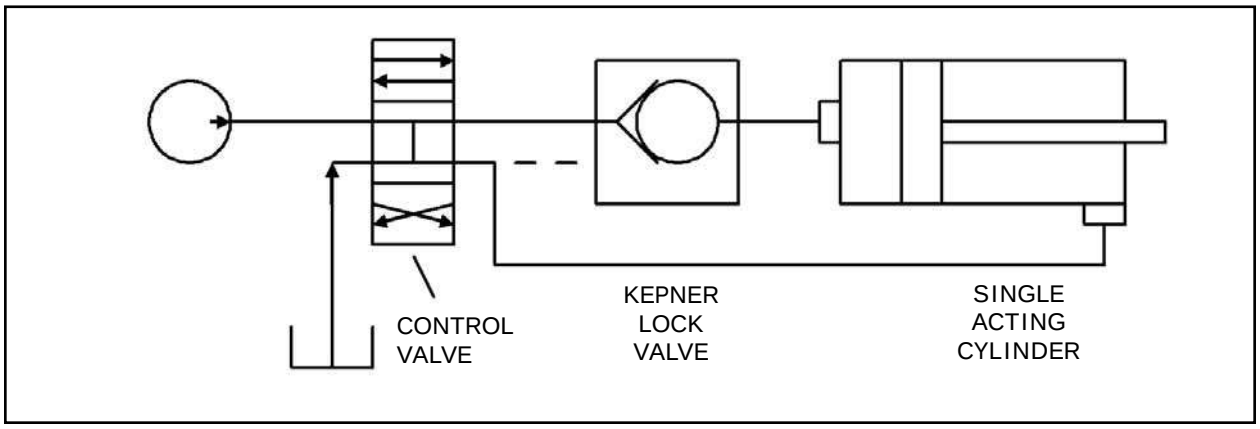
ANSI SYMBOL:



Kep-O-Lok® 2700 series Single Lock valves have the Zero Leakage *Flexible Seal Seat™* and are primarily used as cylinder holding valves. The valve free flows from valve port to cylinder port and checks reverse flow until the pilot is energized. The valve opens to reverse flow on application of pilot pressure.

All Pilot ports are 1/4 NPTF female pipe.
Pipe threads are NPTF (Dryseal) female.
SAE ports are internal straight thread O-Ring boss. Conforms to MS 16142 (SHIPS)

TYPICAL APPLICATION:



The cylinder is held locked, against retracting, by the Kep-O-Lok® Valve, as long as the directional control valve is centered. When the control valve is shifted to the retract position, oil pressure in line to piston rod end is used to pilot the Lock Valve open. The cylinder then retracts.

Kep-O-Lok® valves are used in clamping and position holding applications; and for safety holding against line rupture or control valve leakage.

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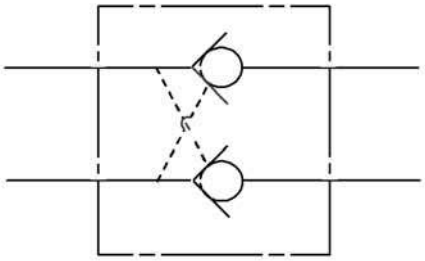
Tips #15

Kep-O-Lok® Dual Lock Valves

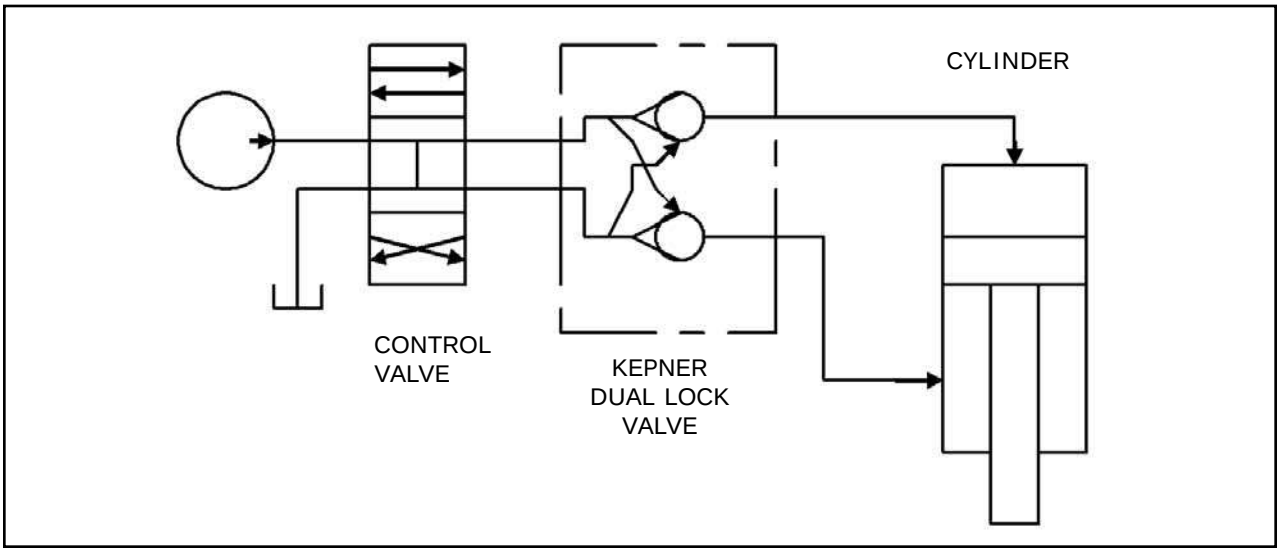
ANSI SYMBOL:



Kep-O-Lok® 2800 series Dual Lock valves have the Zero Leakage *Flexible Seal Seat ™* locking the valve in both directions, and the valve is primarily used for cylinder holding. The valve free flows from valve port to cylinder port on the selected side, while at the same time piloting open the valve module on the other side to allow reverse flow. When the pressure input is removed both valve modules close and lock against movement in either direction by preventing reverse fluid flow in either leg. Piloting is completely internal, and the close fitting pilot piston with pressure balancing grooves assures long life and virtually zero pilot losses.

Pipe threads are NPTF (Dryseal) female.
SAE ports are internal straight thread O-Ring boss.
Conforms to MS 16142 (SHIPS)

TYPICAL APPLICATION:



The cylinder piston is locked in place, in both directions, by the Kep-O-Lok® Dual Lock Valve, as long as the control valve is centered. When the control valve is shifted to either side, oil pressure on the driving side internally pilots open the other valve module, allowing the piston to move as desired.

Kep-O-Lok® Dual Lock Valves are used with double acting cylinders for position locking and for holding against line rupture or control valve leakage.

Consult Factory or Distributor for more help. Customer/user is solely responsible to select products suitable for their specific application requirements and to ensure proper installation, operation and maintenance of these products. Improper selection or use of products can cause personal injury or property damage. All sales are subject to Kepner Products Company Standard Terms and Conditions of Sale. Design subject to change without notice.

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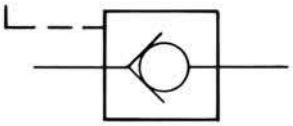
Kepsēl® Cartridge Insert Lock Valves

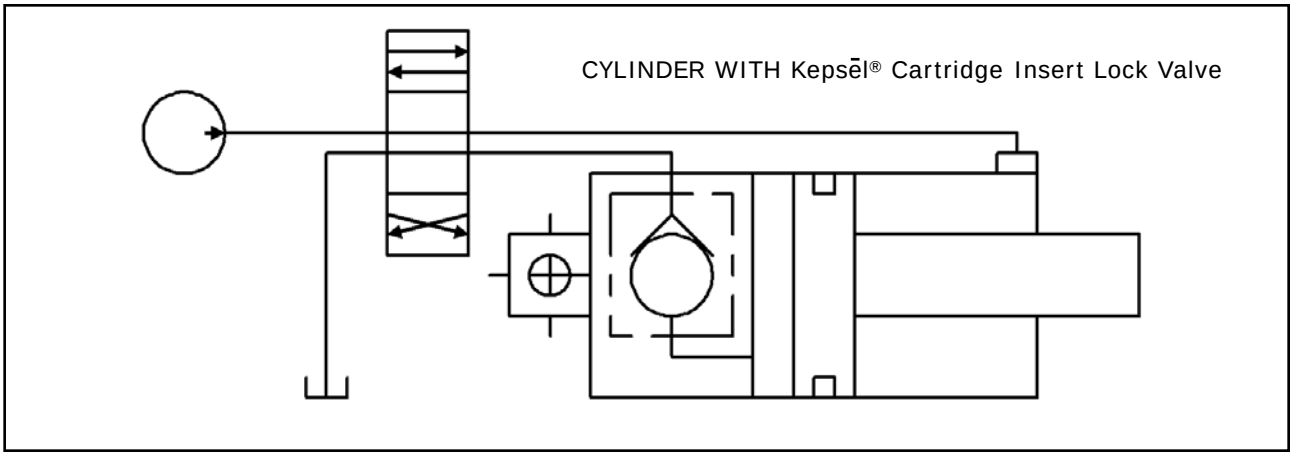
ANSI SYMBOL



Kepsēl® Cartridge Lock Valve Inserts offer the ultimate flexibility in load holding applications. This unique lock valve concept allows direct installation in cylinder heads, manifolds, and sub-plates without the requirement of expensive tools and costly, close tolerance step-cavity machining. Insert may be installed in a simple drilled hole and retained by mating components.

The field proven *Flexible Seal Seat™* design provides positive cylinder lock-up. These valves free flow from valve port to cylinder port and check reverse flow until the pilot is energized. The valve opens to reverse flow on application of pilot pressure. Kepsēl® Cartridge Lock Valve Inserts offer low cost installation, proven performance, compact size, and quick, easy field service to reduce costly down time.

TYPICAL APPLICATION:



The cylinder is held locked, against retracting, by the Kepsēl® Lock Valve Cartridge Insert, as long as the directional control valve is centered. When the control valve is shifted to the retract position, oil pressure in line to piston rod end is used to pilot the lock valve open. The cylinder then retracts.

Kepsēl® Valves are used in clamping cylinders, outrigger stabilizer jacks and other position holding applications. The Cartridge Insert style allows direct installation in cylinder heads or manifolds, for easy service and maximum safety.

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Tips #17

Valve Material Selection

SAFETY WARNING

Kepner standard valves are offered in aluminum, brass, carbon steel, and types 303 and 316 stainless steels. These materials have their inherent strengths and weaknesses. As such, no one material is ideal for all applications and is why we offer a choice of materials. However, making the right choice is an important matter since misuse of valve materials could cause system failure or personal injury. The customer is solely responsible for ordering suitable valve material for their application.

Some factors to consider in selecting suitable material include: its mechanical properties, corrosion resistance, the combinations of temperature and pressure that might be encountered during operation, foreseeable degradation mechanisms (such as corrosion, creep, fatigue), and the material's impact strength to handle possible surge and water hammer effects. One should also be aware of limitations on using free machining steels, such as carbon steel (12L14) and 303 stainless steel, for fatigue critical applications (cyclic loadings). Steel additives such as sulfur, lead and selenium for purpose of improving machinability are typically present as inclusions that can lower fatigue life.

Kepner technical service experts are available to help customers with their material selection. Please contact us for assistance.

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O-Ring Seal Selection Guide

This abridged list provides seal code numbers for most of the common standard and special fluid service requirements used with Kep-O-seal® valves. If your requirement is not shown, please contact the factory for a special recommendation. **New** developments in O-Ring Compounds may obsolete these recommendations. ***It is suggested that service conditions be noted on order.***

SEAL CODE NUMBER	SERVICE CONDITIONS	TEMPERATURE RANGE ° F	COMPOUND
-1**	General purpose oils and lubricants, hydraulic oil, air, water.	-40 to 300 oil 250 air	Buna-N
-3**	High grade exotic material for services requiring a generally inert seal material or wide temperature range.	-300 to 450	Teflon®
-6	90 Durometer Buna-N. General purpose oils and lubricants, hydraulic oil, air, water.	-30 to 275	Buna-N
-9**	Refrigeration gases, (Freon 12, Freon 22), chlorine bleaching compounds - low pressure oxygen.	-45 to 300	Neoprene
-17	Military synthetic lubricants, (MIL-L-7808, MIL-L-6387, MIL-L-6085). Mil. Spec. MIL-R-7362B Specification Comp.	-65 to 300	Buna-N
-**18****	High grade exotic material - petroleum base fluids, many chemicals, high temperature service.	-20 to 400	Viton®
-20	Military hydraulic fluids, (MIL-H-5606). Specification Compound MIL-P-25732.	-65 to 275	Buna-N
-21	High temperature air, oxygen, etc. Consult factory for specific recommendation.	-65 to 450	Silicone
-22	Military aircraft fuels, (0 to 30% Aromatics, MIL-F-5572A, MIL-F-5642C, MIL-H-3136, RP-1), Compound MIL-P-5315A.	-65 to 200	Buna-N
-25**	Steam, water, silicone oils & greases, alkalis, ketones. Excellent for Phosphate Ester base fire resistant fluids.	-70 to 400	Ethylene-Propylene
Kalrez®	Excellent chemical resistance, for service in hot, corrosive environments, oil well sour gas - consult factory for availability.	to 600	Kalrez®

**Seal Code Numbers in bold are standards in the price book.

Above data is for O-Ring only. Valve metal must also be suitable for media and temperature.

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Glossary

Pressure, burst	The pressure which causes failure of and consequential loss of fluid through the product envelope.
Pressure, cracking	The pressure at which a pressure-operated valve begins to pass fluid.
Pressure, override	The difference between the cracking pressure of a valve and the pressure reached when the valve is passing its rated flow.
Pressure, pilot	The pressure in the pilot circuit.
Pressure, proof	The non-destructive test pressure, in excess of the maximum rated operating pressure, which causes no permanent deformation, excessive external leakage, or other resulting malfunction.
Seal, bubble tight	Seal arrangement that does not allow a bubble of air to be forced past it into water or hydraulic fluid.
Seal, leak tight	Seal arrangement that does not allow a drop of hydraulic fluid to be forced past it into air.
Seal, soft seat	Use of an elastomer as a stop or seat for a poppet.
Seal, metal-to-metal	Use of a metal seat and a metal poppet that have been precision made, so that there is no leakage path between them when the poppet is seated. Kepner Products Company valves have a soft seat seal and use a metal-to-metal stop to prevent the poppet from moving through the seal.
Valve, cartridge	A valve with working parts contained in a cylindrical body. The cylindrical body must be inserted into a housing for use. Ports through the body cooperate with ports in the containing housing.
Valve, directional control	A valve whose primary function is to direct or prevent flow through selected passages.
Valve, directly operated	A valve in which the controlling forces acting on the element directly influence the movement of the control elements.
Valve, pilot operated (indirect)	A valve in which a relatively small flow through an integral vent line relief (pilot) controls the movement of the main element.
Valve, pilot	A valve applied to operate another valve or control.

MADE IN USA

NFPA MEMBER

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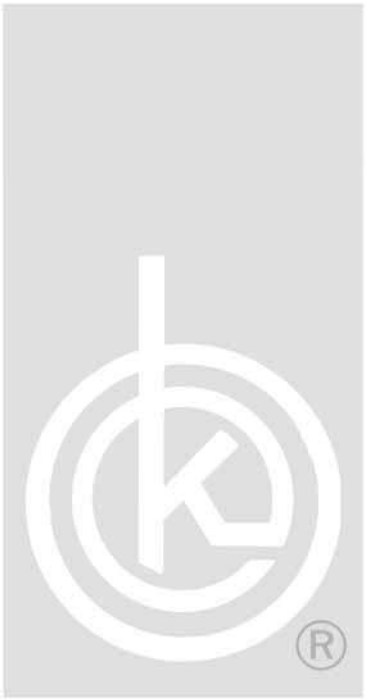

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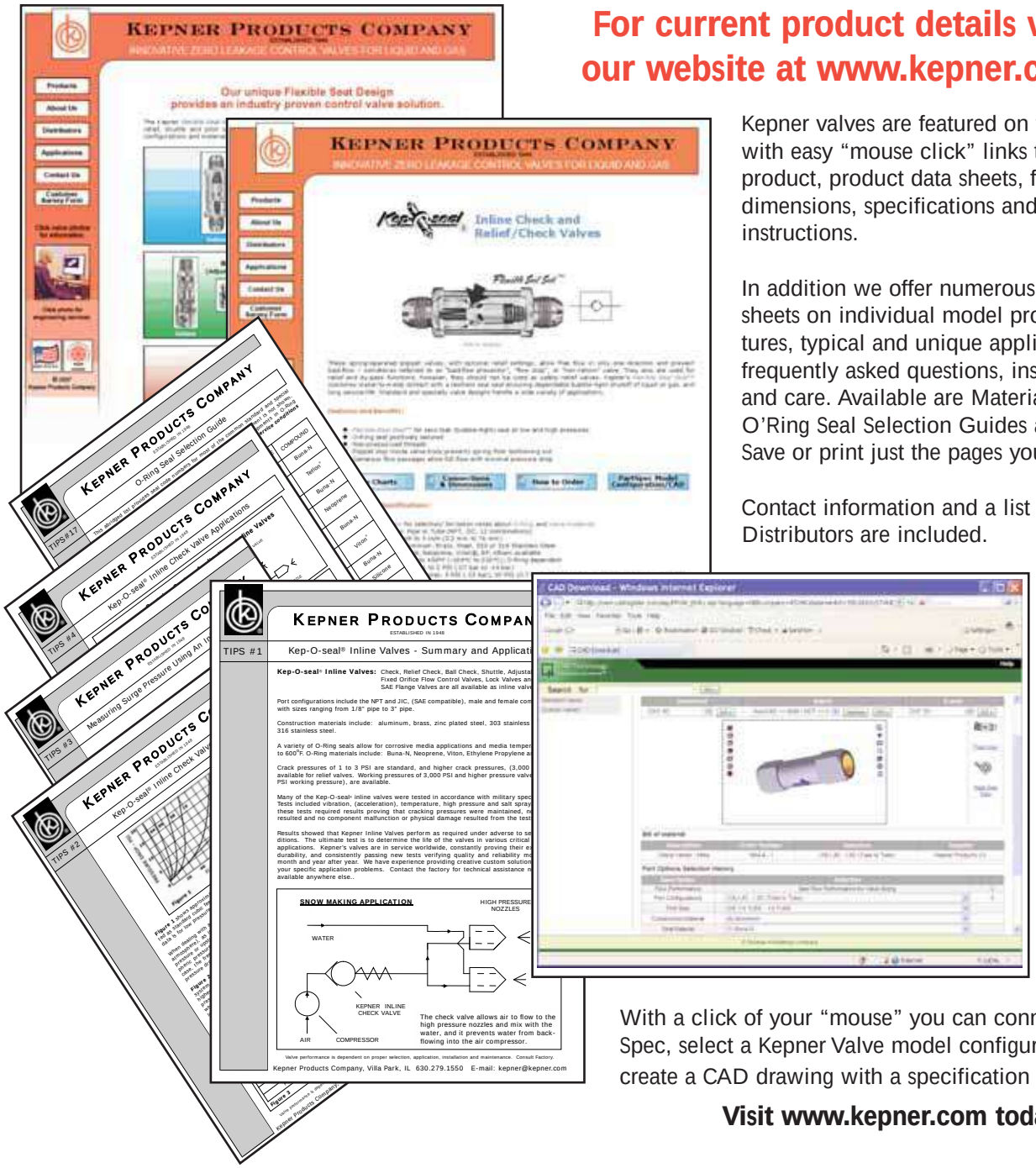

For current product details visit our website at www.kepner.com!

Kepner valves are featured on this site with easy "mouse click" links to each product, product data sheets, flow charts, dimensions, specifications and ordering instructions.

In addition we offer numerous "Tips" sheets on individual model product features, typical and unique applications, frequently asked questions, installation and care. Available are Materials and O'Ring Seal Selection Guides and more. Save or print just the pages you need.

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