



Heavy Vehicle Products

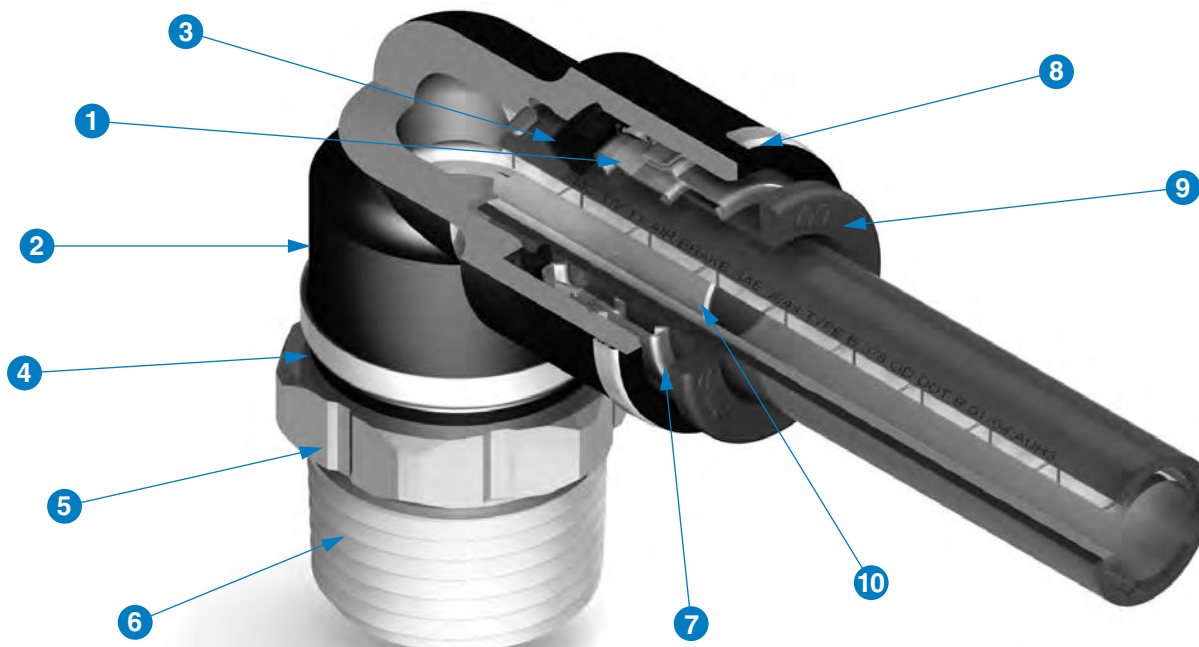
Series KV2 Fittings and TIV Tubing

FMVSS (DOT) & SAE Compliant



- **One-touch connection reduces installation time and cost.**
- **Rugged ultraviolet and vibration resistant composite body.**
- **Various shapes and configurations to meet vehicle applications and make installation easier.**

Series KV2 Fittings - Key Elements and Materials



1. Chuck

Stainless steel or brass chuck design permits smooth tube entry and high gripping force.

2. Body

SMC's composite body offers:

1. Weight savings
2. Compact dimensions
3. High performance
4. Superior chemical resistance

3. Tube Seal

SMC's engineered low temperature seal goes beyond the standard O-ring seal.

4. Stud End O-Ring

O-ring seal permits the fitting to be positioned into place after installation. (not shown)

5. Stud

Brass (thread portion) stud end, NPT (male); NPT (female.)

6. Sealant

Standard, pre-applied thread sealant facilitates installation.

7. Guide

Holds internal components together and also guides release button.

8. Stabilization Ring

SMC's patented stabilization ring ensures high temperature stability and maximum performance with a smaller overall package.

9. Release Button

SMC's large release button contacts the chuck when pushed in. This design has two benefits:

1. Chuck does not scrape tube during insertion or removal.
2. Lower insertion and release forces.

10. Tube Support

A fixed tube support promotes easier tube insertion, superior side load performance and increased tube retention.

1. Chuck	Stainless Steel or Brass
2. Body	Polybutylene Terephthalate (PBT), Brass
3/4. Tube Seal, O-Ring	Buna-N, Nitrile Rubber
5. Stud	Brass
6. Sealant	Fluorine/Acrylic
7. Guide	Stainless Steel or Polyoxymethylene (POM)
8. Stabilization Ring	Stainless Steel
9. Release Button	Polyoxymethylene (POM)
10. Tube Support	Stainless Steel / Brass

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Series KV2 DOT and SAE Approved Fittings

In 1998, SMC Corporation of America brought its technology and expertise to the Heavy Vehicle Industry. Within the realm of pneumatic and electro-pneumatic applications in heavy-duty trucks, buses, trailers and a variety of other suppliers to this industry, SMC products are state-of-the-art and always on the cutting edge of technology.

SMC takes pride in our ability to evaluate an industry's needs and develop the systems and products to maximize efficiency of assembly and operation.

For more information on SMC and its heavy vehicle products, please contact your local SMC sales representative at an SMC branch near you.

USA www.smcusa.com
 Canada www.smc Pneumatics.ca
 CAD Drawings www.smcetech.com

Specifications for Series KV2 - FMVSS (D.O.T.) and SAE Compliant Fittings

Recommended Operating Fluid	Air						
Max. Operating Pressure	145psi (1.0MPa)						
Proof Pressure	Size	5/32"	1/4"	3/8"	1/2"	5/8"	3/4"
	At 75°F (24°C)	1200psi	1200psi	1400psi	950psi	900psi	800psi
	At 200°F (93°C)	450psi (3.1MPa)					
Recommended Operating Fluid at Ambient Temperature*	-40°F to 140°F (-40°C to 60°C)						
Leak Rate at -40°F (-40°C)	7 Ncm³/min. or less						
Thread	Thread Portion	ANSI/ASME B1.20.1, 1983, R1992					
	Nut	JIS B 0208 (Unified fine thread), ISO 263					
Thread Sealant	Fluorine/Acrylic						
Applicable Standards	D.O.T. FMVSS 49 CFR 571.106, SAE J2494-3						
Applicable Tubing	Tubing conforming to both SAE J844 and D.O.T. FMVSS 49 CFR 571.106. Material: Nylon 12						
Tube O.D.	5/32", 1/4", 3/8", 1/2", 5/8", 3/4"						
Fitting Dimensions	All dimensions reference only and subject to change without notification						

Applicable Patents: 6,312,019; 6,578,879; 6,843,507; 6,869,109; 6,880,864; 7,093,862; 7,210,708

*Note: Recommended operating fluid and ambient temperature range provides best performance and longest life. Products are tested from -40°F to 200°F (-40°C to 93°C) per FMVSS 49CFR571.106.

How to Order

Series **KV2**

Body Style **L**

Thread Size **07** - **35**

Sealant **S** With Sealant (as applicable)

H	Male Connector Straight Union Cartridge Straight
K	Male 45° Elbow Cartridge 45° Elbow
L	Male 90° Elbow Plug-In 90° Elbow Union 90° Elbow Cartridge 90° Elbow
T	Male Branch Tee Union Tee
U	Male Branch "Y" Union "Y" Plug-In "Y"
VD	Male Double Universal 90° Elbow
Y	Male Run Tee
Z	Male Branch Universal 90° Elbow

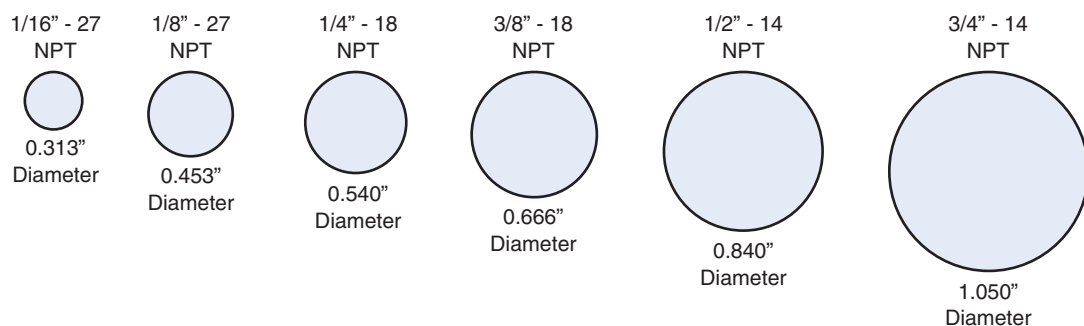
F	Female Connector
LF	Female 90° Elbow
VF	Female Universal 90° Elbow
KF	Female 45° Elbow
TF	Female Branch Tee
E	Female Bulkhead Connector Bulkhead Union
R	Plug-In Reducer
UD	Male Double "Y" Union Double "Y"

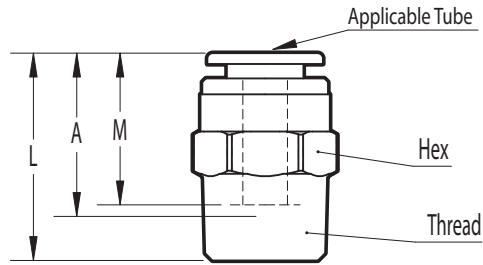
P Plug

33	1/16" NPT
34	1/8" NPT
35	1/4" NPT
36	3/8" NPT
37	1/2" NPT
38	3/4" NPT
00	Union
99	Plug-In
Q	Cartridge
S	SAE 45° Flare

03	5/32"
07	1/4"
11	3/8"
13	1/2"
15	5/8"
19	3/4"

Pipe Thread Outside Diameter - Actual Size

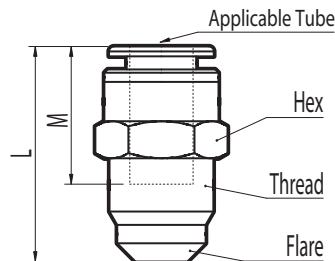


Straight Male Connector
KV2H__-__S


App. Tube OD (inch)	Thread NPT	Part Number	Hex	L	A*	M	Min. Flow Dia.	Weight (grams)	Bag/Box Quantity
5/32	1/16-27	KV2H03-33S	11.11	21.7	17.6	16	1.6	8	100/800
5/32	1/8-27	KV2H03-34S	11.11	21.7	17.6	16	1.6	9	100/800
5/32	1/4-18	KV2H03-35S	14.29	19.2	13.4	16	1.6	14	100/800
1/4	1/8-27	KV2H07-34S	12.70	22.2	18.1	17	3.5	8	100/1000
1/4	1/4-18	KV2H07-35S	14.29	22.7	16.9	17	3.5	14	100/800
1/4	3/8-18	KV2H07-36S	17.46	21.7	15.6	17	3.5	24	100/600
1/4**	1/2-14	KV2H07-37S	22.23	26.0	17.8	17	3.5	54	100/200
3/8	1/8-27	KV2H11-34S	17.46	30.7	26.6	21	5.4	23	100/400
3/8	1/4-18	KV2H11-35S	17.46	33.2	27.4	21	5.4	27	100/400
3/8	3/8-18	KV2H11-36S	17.46	28.7	22.6	21	5.4	25	100/400
3/8	1/2-14	KV2H11-37S	22.23	26.2	18.1	21	5.4	42	100/200
1/2	1/4-18	KV2H13-35S	22.23	34.2	28.4	22	8.5	40	100/200
1/2	3/8-18	KV2H13-36S	22.23	32.7	26.6	22	8.5	40	100/200
1/2	1/2-14	KV2H13-37S	22.23	29.7	21.6	22	8.5	41	100/200
5/8	3/8-18	KV2H15-36S	25.40	38.6	32.5	25	9.8	68	100/200
5/8	1/2-14	KV2H15-37S	25.40	37.9	29.8	25	9.8	57	100/200
3/4	3/8-18	KV2H19-36S	30.00	47.5	41.4	33	11.0	111	50/100
3/4	1/2-14	KV2H19-37S	30.00	50.5	42.4	33	11.0	121	50/100
3/4**	3/4-14	KV2H19-38S	30.00	52.5	43.9	33	11.0	172	50/100

** Non-Standard Product, consult factory for lead time.

* Dimension A reference after installation.

Straight SAE Flare
KV2H__-S__


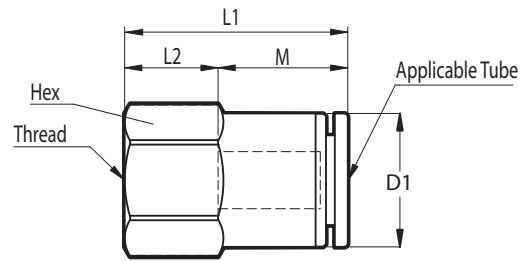
App. Tube OD (inch)	Thread	Part Number	Hex	L	M	Min. Flow Dia.	Weight (grams)	Bag/Box Quantity
1/4**	7/16-20 UNF	KV2H07-S04	14.29	27.4	17	3.5	14	200/800
3/8**	5/8-18 UNF	KV2H11-S06	17.46	33.0	21	5.4	26	100/400
1/2**	5/8-18 UNF	KV2H13-S06	22.23	39.5	22	8.5	40	100/200
1/2**	3/4-16 UNF	KV2H13-S08	22.23	36.8	22	8.5	61	100/200

** Non-Standard Product, consult factory for lead time.

A: SAE45° Flare(SAEJ513)

KV2F _ _ _

Female Connector

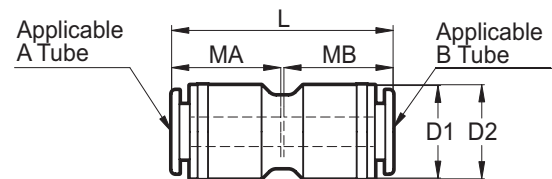


App. Tube OD (inch)	Thread NPT	Part Number	Hex	D1	L1	L2	M	Min. Flow Dia.	Wt. (g)	Bag/Box Quantity
5/32	1/8-27	KV2F03-34	14.29	10.0	27.0	10.8	16	1.6	17	100/800
5/32	1/4-18	KV2F03-35	17.46	10.0	30.7	13.5	16	1.6	26	100/400
1/4	1/8-27	KV2F07-34	14.29	12.5	27.5	10.6	17	3.5	17	100/800
1/4	1/4-18	KV2F07-35	17.46	12.5	31.2	13.3	17	3.5	26	100/400
1/4	3/8-18	KV2F07-36	22.23	12.5	33.3	15.2	17	3.5	45	100/200
3/8	1/8-27	KV2F11-34	17.46	17.4	30.8	11.3	21	5.4	32	100/200
3/8	1/4-18	KV2F11-35	17.46	17.4	34.5	15.0	21	5.4	33	100/200
3/8	3/8-18	KV2F11-36	22.23	17.4	36.6	15.5	21	5.4	51	100/200
3/8	1/2-14	KV2F11-37	23.81	17.4	40.6	18.9	21	5.4	55	100/200
1/2	1/8-27	KV2F13-34	22.23	21.0	31.4	9.9	22	8.5	52	100/200
1/2	1/4-18	KV2F13-35	22.23	21.0	35.4	13.8	22	8.5	59	100/200
1/2	3/8-18	KV2F13-36	22.23	21.0	36.4	14.8	22	8.5	53	100/200
1/2	1/2-14	KV2F13-37	23.80	21.0	40.8	18.8	22	8.5	59	100/200
5/8**	1/2-14	KV2F15-37	25.40	25.2	42.9	18.3	24.6	9.8	84	100/100

** Non-Standard Product, consult factory for lead time.

KV2H _ _ _

Straight Union

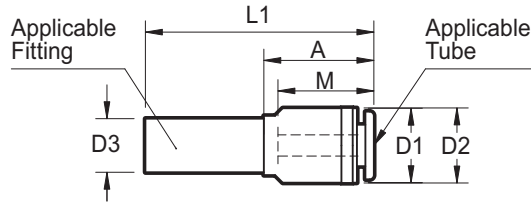


App. A Tube OD (inch)	App. B Tube OD (inch)	Part Number	D1	D2	L	MA	MB	Min. Flow Dia.	Wt. (g)	Bag/Box Quantity
5/32	5/32	KV2H03-00	10.4	10.6	32.6	16	16	1.6	5	100/800
5/32**	1/4	KV2H03-07	13.2	13.3	34.6	16	17	1.6	6	100/800
1/4	1/4	KV2H07-00	13.2	13.3	34.6	17	17	3.5	6	100/1200
1/4**	3/8	KV2H07-11	17.9	18.1	42.1	17	21	3.5	15	100/400
3/8	3/8	KV2H11-00	17.9	18.1	42.6	21	21	5.4	15	100/600
3/8**	1/2	KV2H11-13	21.7	22.1	44.6	21	22	5.4	21	100/200
1/2	1/2	KV2H13-00	21.7	22.1	44.6	22	22	8.5	21	100/200
5/8	5/8	KV2H15-00	26.5	27.0	53.4	25	25	9.8	35	100/200
3/4**	3/4	KV2H19-00	32.6	32.9	68.2	33	33	13.6	57	50/100

** Non-Standard Product, consult factory for lead time.

Plug-In Reducer

KV2R__-__



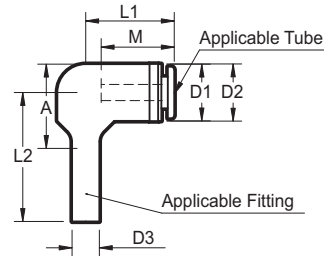
Applicable Tube (inch)	Applicable Fitting (inch)	Part Number	D1	D2	D3	A*	L1	M	Min. Flow Dia.	Weight (grams)	Bag/Box Quantity
1/4**	3/8	KV2R07-11	13.2	13.2	9.50	18.6	39.6	17	3.5	4	200/1000
3/8**	1/4	KV2R11-07	17.9	18.1	6.35	28.4	45.4	21	4.5	4	100/800
3/8**	1/2	KV2R11-13	17.9	18.1	12.7	22.0	44.0	21	5.4	3.4	100/500

** Non-Standard Product, consult factory for lead time.

* Dimension A reference after installation.

Plug-In 90° Elbow

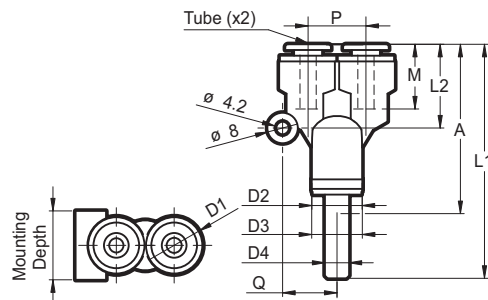
KV2L__-99



Applicable Tube (inch)	Applicable Fitting (inch)	Part Number	D1	D2	D3	L1	L2	A*	M	Min. Flow Dia.	Weight (grams)	Bag/Box Quantity
1/4	1/4	KV2L07-99	13.2	13.3	6.40	20.6	30.0	19.6	17.0	3.0	5	500/1000

Plug-In “Y”

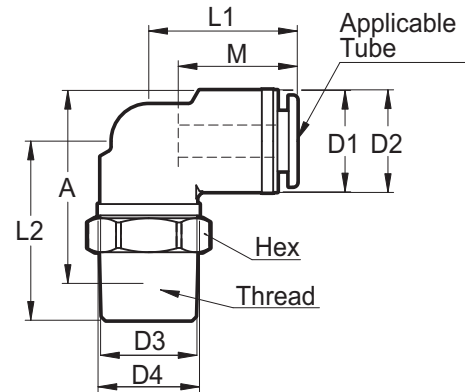
KV2U__-99



Applicable Tube OD (inch)	Part Number	D1	D2	D3	D4	L1	L2	A*	Q	P	M	Min. Flow Dia.	Mounting Depth	Wt. (g)	Bag/Box Quantity
1/4	KV2U07-99-1	15.2	13.2	13.3	6.4	61.5	22.0	44.5	14.3	15.2	17.0	3.0	15.4	13	100/400

KV2L_ _ _ S

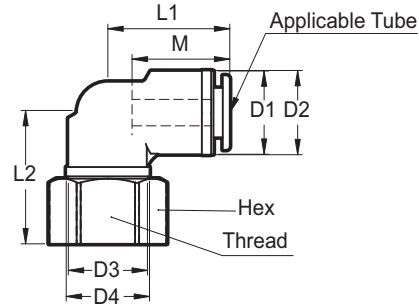
90° Male Elbow



App. Tube OD (inch)	Thread NPT	Part Number	Hex	D1	D2	D3	D4	L1	L2	A*	M	Min. Flow Dia.	Weight (grams)	Bag/Box Quantity
5/32	1/8-27	KV2L03-34S	14.29	13.2	13.2	13.2	13.2	20.6	23.4	25.9	16	1.6	13	100/800
5/32**	1/4-27	KV2L03-35S	14.29	13.2	13.2	13.2	13.2	20.6	27.4	28.2	16	1.6	20	100/600
1/4	1/8-27	KV2L07-34S	14.29	13.2	13.3	13.2	13.2	20.6	23.4	25.9	17	3.5	13	100/800
1/4	1/4-18	KV2L07-35S	14.29	13.2	13.3	13.2	13.2	20.6	27.4	28.2	17	3.5	20	100/600
1/4	3/8-18	KV2L07-36S	17.46	13.2	13.3	13.2	13.2	20.6	29.4	29.9	17	3.5	34	100/400
1/4**	1/2-14	KV2L07-37S	22.23	13.2	13.3	13.2	13.2	20.6	33.4	31.9	17	3.5	65	100/200
3/8	1/8-27	KV2L11-34S	19.00	17.9	18.1	17.0	17.9	26.2	26.6	31.5	21	5.4	30	100/400
3/8	1/4-18	KV2L11-35S	19.00	17.9	18.1	17.0	17.9	26.2	29.6	32.8	21	5.4	28	100/400
3/8	3/8-18	KV2L11-36S	19.00	17.9	18.1	17.0	17.9	26.2	31.6	34.5	21	5.4	37	100/200
3/8	1/2-14	KV2L11-37S	22.23	17.9	18.1	17.0	17.9	26.2	35.6	36.5	21	5.4	63	100/200
1/2	1/4-18	KV2L13-35S	19.00	21.7	22.1	17.0	17.9	28.8	31.5	36.6	22	8.5	32	100/200
1/2	3/8-18	KV2L13-36S	19.00	21.7	22.1	17.0	17.9	28.8	33.5	38.3	22	8.5	41	100/200
1/2	1/2-14	KV2L13-37S	22.23	21.7	22.1	17.0	17.9	28.8	37.5	40.3	22	8.5	65	100/200
1/2**	3/4-14	KV2L13-38S	28.57	21.7	22.1	17.0	17.9	29.0	40.7	42.9	22	8.5	70	50/100
5/8	3/8-18	KV2L15-36S	23.80	26.5	27.0	20.9	21.9	33.4	37.8	45.0	25	9.8	64	100/200
5/8	1/2-14	KV2L15-37S	23.80	26.5	27.0	20.9	21.9	33.4	40.8	46.0	25	9.8	80	100/100
5/8**	3/4-14	KV2L15-38S	28.57	26.5	27.0	20.9	21.9	33.4	44.1	48.8	25	9.8	132	50/50
3/4	1/2-14	KV2L19-37S	28.57	32.6	32.9	26.2	27.0	44.1	45.5	53.7	33	12.8	116	50/100
3/4**	3/4-14	KV2L19-38S	28.57	32.6	32.9	26.2	27.0	44.1	48.7	56.3	33	12.8	150	50/100

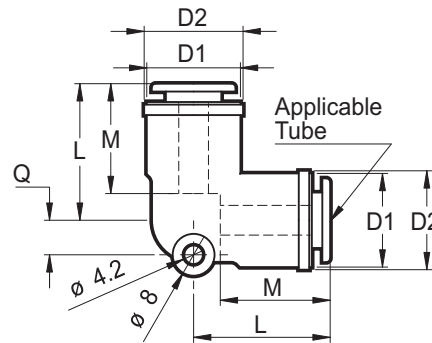
** Non-Standard Product, consult factory for lead time.

* Dimension A reference after installation.

90° Female Elbow
KV2LF__-__


App. Tube OD (inch)	Thread NPT	Part Number	Hex	D1	D2	D3	D4	L1	L2	M	Min. Flow Dia.	Weight (grams)	Bag/Box Quantity
5/32	1/8-27	KV2LF03-34	14.29	13.2	13.2	13.2	13.2	20.6	22.0	16	1.6	15	100/400
5/32	1/4-18	KV2LF03-35	17.46	13.2	13.2	13.2	13.2	20.6	25.5	16	1.6	23	100/400
1/4	1/8-27	KV2LF07-34	14.29	13.2	13.3	13.2	13.2	20.6	22.0	17	3.5	14	100/800
1/4	1/4-18	KV2LF07-35	17.46	13.2	13.3	13.2	13.2	20.6	25.5	17	3.5	23	100/400
1/4	3/8-18	KV2LF07-36	22.23	13.2	13.3	13.2	13.2	20.6	26.0	17	3.5	35	100/200
3/8	1/8-27	KV2LF11-34	17.46	17.9	18.1	17.0	17.9	26.2	18.8	21	5.4	22	100/200
3/8	1/4-18	KV2LF11-35	17.46	17.9	18.1	17.0	17.9	26.2	27.7	21	5.4	31	100/200
3/8	3/8-18	KV2LF11-36	22.23	17.9	18.1	17.0	17.9	26.2	28.2	21	5.4	43	100/200
3/8	1/2-14	KV2LF11-37	23.80	17.9	18.1	17.0	17.9	26.2	32.2	21	5.4	47	100/200
1/2	1/4-18	KV2LF13-35	17.46	21.7	22.1	17.0	17.9	28.8	29.6	22	8.5	35	100/200
1/2	3/8-18	KV2LF13-36	22.23	21.7	22.1	17.0	17.9	28.8	30.1	22	8.5	47	100/200
1/2	1/2-14	KV2LF13-37	23.80	21.7	22.1	17.0	17.9	28.8	34.1	22	8.5	52	100/200
5/8**	1/2-14	KV2LF15-37	23.80	26.5	27.0	20.9	21.9	33.5	37.5	25	9.8	60	50/100

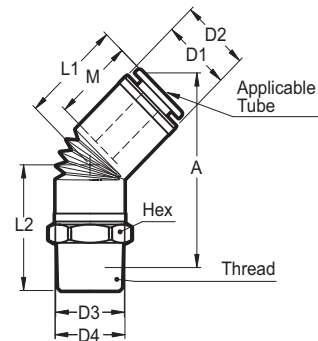
** Non-Standard Product, consult factory for lead time.

Union 90° Elbow
KV2L__-00


App. Tube OD (inch)	Part Number	D1	D2	L	Q	M	Min. Flow Dia.	Weight (grams)	Bag/Box Quantity
5/32	KV2L03-00	10.4	10.6	18.3	4.5	16	1.6	5	100/800
1/4	KV2L07-00	13.2	13.3	20.6	5.3	17	3.5	7	100/1000
3/8	KV2L11-00	17.9	18.1	26.1	6.6	21	5.4	16	100/400
1/2	KV2L13-00	21.7	22.1	28.9	7.8	22	8.5	23	100/200

KV2K _ _ _ S

45° Male Elbow

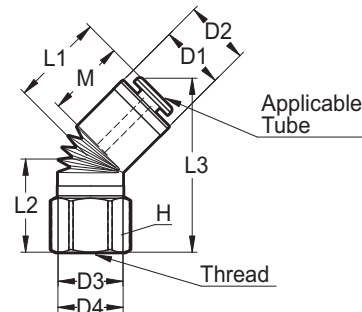


App. Tube OD (inch)	Thread NPT	Part Number	Hex	D1	D2	D3	D4	L1	L2	A*	M	Min. Flow Dia.	Weight (grams)	Bag/Box Quantity
5/32	1/8-27	KV2K03-34S	14.29	13.2	13.2	13.2	13.2	19.0	20.3	33.9	16	1.6	13	100/800
1/4	1/8-27	KV2K07-34S	14.29	13.2	13.3	13.2	13.2	19.0	20.3	33.9	17	3.5	13	100/800
1/4	1/4-18	KV2K07-35S	14.29	13.2	13.3	13.2	13.2	19.0	24.3	36.2	17	3.5	20	100/400
1/4	3/8-18	KV2K07-36S	17.46	13.2	13.3	13.2	13.2	19.0	26.3	37.9	17	3.5	33	100/400
3/8	1/8-27	KV2K11-34S	19.00	17.9	18.1	17.9	18.2	26.2	26.6	46.7	21	5.4	29	100/200
3/8	1/4-18	KV2K11-35S	19.00	17.9	18.1	17.9	18.2	26.2	29.6	48.0	21	5.4	28	100/400
3/8	3/8-18	KV2K11-36S	19.00	17.9	18.1	17.9	18.2	26.2	31.6	49.7	21	5.4	36	100/200
3/8	1/2-14	KV2K11-37S	22.23	17.9	18.1	17.9	18.2	26.2	35.6	51.7	21	5.4	61	100/200
1/2	1/8-27	KV2K13-34S	23.80	21.7	22.1	21.7	22.0	28.8	29.5	52.9	22	6.0	38	100/200
1/2	1/4-18	KV2K13-35S	23.80	21.7	22.1	21.7	22.0	28.8	32.5	54.2	22	8.5	37	100/200
1/2	3/8-18	KV2K13-36S	23.80	21.7	22.1	21.7	22.0	28.8	33.5	55.1	22	8.5	47	100/200
1/2	1/2-14	KV2K13-37S	23.80	21.7	22.1	21.7	22.0	28.8	37.5	56.8	22	8.5	67	100/200
5/8	3/8-18	KV2K15-36S	23.80	26.5	27.0	20.9	21.9	29.6	32.0	55.9	25	9.8	62	100/200
5/8	1/2-14	KV2K15-37S	23.80	26.5	27.0	20.9	21.9	29.6	35.0	56.9	25	9.8	78	100/200
3/4	1/2-14	KV2K19-37S	28.57	32.6	32.9	26.2	27.0	39.1	41.9	71.7	33	12.8	116	50/100

* Dimension A reference after installation.

KV2KF _ _ _ _

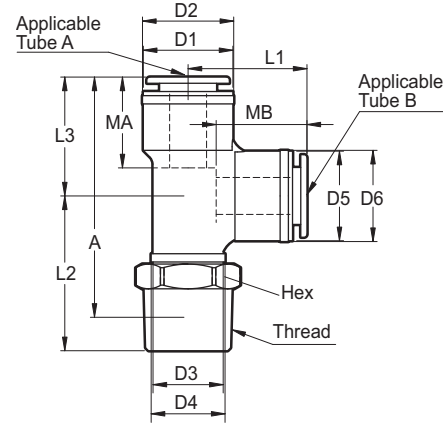
45° Female Elbow



App. Tube OD (inch)	Thread NPT	Part Number	Hex	D1	D2	D3	D4	L1	L2	L3	M	Min. Flow Dia.	Weight (grams)	Bag/Box Quantity
3/8	3/8-18	KV2KF11-36	22.23	17.9	18.1	17.9	18.2	26.2	28.2	52.4	21	5.4	42	100/200

Male Run Tee

KV2Y__-__S



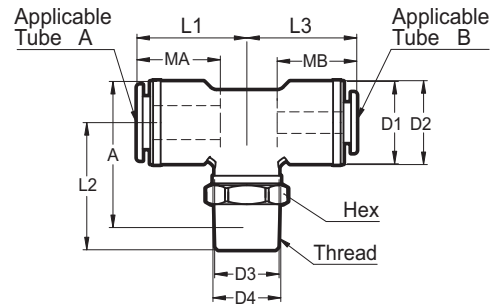
App. A Tube OD (inch)	App. B Tube OD (inch)	Thread NPT	Part Number	Hex	D1	D2	D3	D4	D5	D6	L1	L2	L3	A*	MA	MB	Min. Flow Dia.	Wt. (g)	Bag/Box Quantity
5/32**	1/4	1/4-18	KV2Y03-07-35S	14.29	13.2	13.2	13.2	13.2	13.2	13.3	20.6	27.4	20.6	46.0	16	17	1.6	23	100/400
5/32	5/32	1/16-18	KV2Y03-33S	14.29	13.2	13.2	13.2	13.2	13.2	13.2	20.6	23.4	20.6	39.9	16	16	1.6	15	100/400
5/32	5/32	1/8-27	KV2Y03-34S	14.29	13.2	13.2	13.2	13.2	13.2	13.2	20.6	23.4	20.6	39.9	16	16	1.6	16	100/400
5/32	5/32	1/4-18	KV2Y03-35S	14.29	13.2	13.2	13.2	13.2	13.2	13.2	20.6	27.4	20.6	42.2	16	16	1.6	23	100/400
1/4**	3/8	1/4-18	KV2Y07-11-35S	19.00	17.9	18.1	17.0	17.9	17.9	18.1	26.2	29.6	26.2	49.6	17	21	3.5	40	100/200
1/4	1/4	1/8-27	KV2Y07-34S	14.29	13.2	13.3	13.2	13.2	13.2	13.3	20.6	23.4	20.6	39.9	17	17	3.5	16	100/600
1/4	1/4	1/4-18	KV2Y07-35S	14.29	13.2	13.3	13.2	13.2	13.2	13.3	20.6	27.4	20.6	42.2	17	17	3.5	23	100/400
1/4	1/4	3/8-18	KV2Y07-36S	17.46	13.2	13.3	13.2	13.2	13.2	13.3	20.6	29.4	20.6	43.9	17	17	3.5	37	100/400
3/8**	1/4	1/4-18	KV2Y11-07-35S	19.00	17.9	18.1	17.0	17.9	17.9	18.1	25.7	29.6	25.7	50.0	21	17	3.5	40	100/200
3/8**	1/4	3/8-18	KV2Y11-07-36S	19.00	17.9	18.1	17.0	17.9	17.9	18.1	25.7	32.0	25.7	51.5	21	17	3.5	53	100/200
3/8	3/8	1/4-18	KV2Y11-35S	19.00	17.9	18.1	17.0	17.9	17.9	18.1	26.2	29.6	26.2	50.0	21	21	5.4	36	100/200
3/8	3/8	3/8-18	KV2Y11-36S	19.00	17.9	18.1	17.0	17.9	17.9	18.1	26.2	31.6	26.2	51.7	21	21	5.4	44	100/200
3/8	3/8	1/2-14	KV2Y11-37S	22.23	17.9	18.1	17.0	17.9	17.9	18.1	26.2	35.6	26.2	53.7	21	21	5.4	68	100/200
1/2**	1/4	1/2-14	KV2Y13-07-37S	23.80	21.7	22.1	17.0	17.9	17.9	18.1	26.6	35.6	27.8	51.8	21.8	16.8	4.6	76	100/100
1/2**	3/8	3/8-18	KV2Y13-11-36S	23.80	21.7	22.1	17.0	17.9	17.9	18.1	27.1	31.6	27.8	61.9	21.8	20.4	7.0	64	100/100
1/2**	3/8	1/2-14	KV2Y13-11-37S	22.23	21.7	22.1	17.0	17.9	17.9	18.1	27.1	21.3	27.8	63.9	21.8	20.4	7.0	76	100/100
1/2	1/2	1/4-18	KV2Y13-35S	19.00	21.7	22.1	17.0	17.9	21.7	22.1	28.8	31.5	28.8	54.5	22	2	8.5	43	100/200
1/2	1/2	3/8-18	KV2Y13-36S	19.00	21.7	22.1	17.0	17.9	21.7	22.1	28.8	33.5	28.8	56.2	22	22	8.5	51	100/100
1/2	1/2	1/2-14	KV2Y13-37S	22.23	21.7	22.1	17.0	17.9	21.7	22.1	28.8	37.5	28.8	58.2	22	22	8.5	76	100/100
5/8**	5/8	1/2-14	KV2Y15-37S	23.80	26.5	27.0	20.9	21.9	26.5	27.0	33.5	41.0	33.5	66.0	25	25	9.8	126	50/100

** Non-Standard Product, consult factory for lead time.

* Dimension A reference after installation.

KV2T _ _ _ S

Male Branch Tee



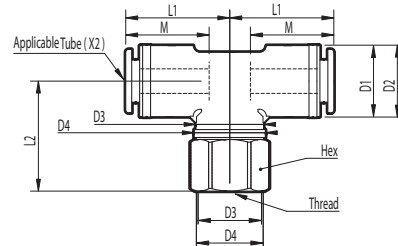
App. A Tube OD (inch)	App. B Tube OD (inch)	Thread NPT	Part Number	Hex	D1	D2	D3	D4	L1	L2	L3	A*	MA	MB	Min. Flow Dia.	Wt. (g)	Bag/Box Quantity
5/32	5/32	1/16-27	KV2T03-33S	14.29	13.2	13.2	13.2	13.2	20.6	23.4	20.6	25.9	16	16	1.6	15	100/400
5/32	5/32	1/8-27	KV2T03-34S	14.29	13.2	13.2	13.2	13.2	20.6	23.4	20.6	25.9	16	16	1.6	15	100/400
5/32	5/32	1/4-18	KV2T03-35S	14.29	13.2	13.2	13.2	13.2	20.6	27.4	20.6	28.2	16	16	1.6	23	100/400
1/4**	3/8	1/4-18	KV2T07-11-35S	19.00	17.9	18.1	17.0	17.9	25.7	29.5	26.2	32.7	17	21	3.5	40	100/300
1/4**	3/8	3/8-18	KV2T07-11-36S	19.00	17.9	18.1	17.0	17.9	25.7	32.1	26.2	26.0	17	21	3.5	42	100/200
1/4	1/4	1/8-27	KV2T07-34S	14.29	13.2	13.3	13.2	13.2	20.6	23.4	20.6	25.9	17	17	3.5	16	100/400
1/4	1/4	1/4-18	KV2T07-35S	14.29	13.2	13.3	13.2	13.2	20.6	27.4	20.6	28.2	17	17	3.5	23	100/400
1/4	1/4	3/8-18	KV2T07-36S	17.46	13.2	13.3	13.2	13.2	20.6	29.4	20.6	29.9	17	17	3.5	36	100/400
3/8**	1/2	3/8-14	KV2T11-13-36S	19.00	21.7	22.1	17.0	17.9	28.8	33.5	28.8	38.3	21	22	5.4	40	100/200
3/8**	1/2	1/2-14	KV2T11-13-37S	22.23	21.7	22.1	17.0	17.9	28.8	37.7	28.8	40.4	21	22	5.4	75	100/100
3/8	3/8	1/8-27	KV2T11-34S	19.00	17.9	18.1	17.0	17.9	26.2	26.6	26.2	31.5	21	21	5.4	37	100/200
3/8	3/8	1/4-18	KV2T11-35S	19.00	17.9	18.1	17.0	17.9	26.2	29.6	26.2	32.8	21	21	5.4	35	100/200
3/8	3/8	3/8-18	KV2T11-36S	19.00	17.9	18.1	17.0	17.9	26.2	31.6	26.2	34.5	21	21	5.4	44	100/200
3/8	3/8	1/2-14	KV2T11-37S	22.23	17.9	18.1	17.0	17.9	26.2	35.6	26.2	36.5	21	21	5.4	68	100/200
1/2	1/2	1/4-18	KV2T13-35S	19.00	21.7	22.1	17.0	17.9	28.8	31.5	28.8	36.6	22	22	8.5	43	100/200
1/2	1/2	3/8-18	KV2T13-36S	19.00	21.7	22.1	17.0	17.9	28.8	33.5	28.8	38.3	22	22	8.5	51	100/200
1/2	1/2	1/2-14	KV2T13-37S	22.23	21.7	22.1	17.0	17.9	28.8	37.5	28.8	40.3	22	22	8.5	75	100/100
5/8	5/8	3/8-18	KV2T15-36S	23.80	26.5	27.0	20.9	21.9	33.4	37.8	33.4	45.3	25	25	9.8	81	100/100
5/8	5/8	1/2-14	KV2T15-37S	23.80	26.5	27.0	20.9	21.9	33.4	40.8	33.4	46.0	25	25	9.8	97	100/100

** Non-Standard Product, consult factory for lead time.

* Dimension A reference after installation.

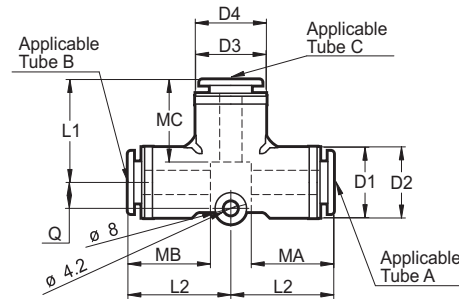
KV2TF _ _ _ _

Female Branch Tee



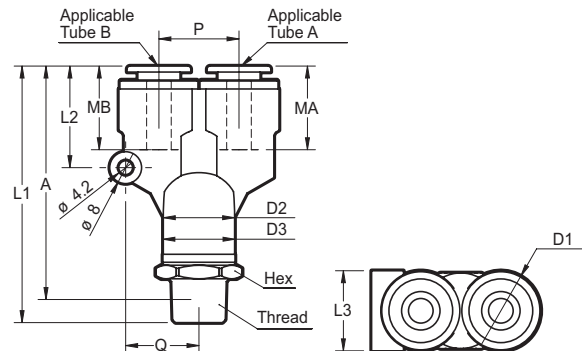
App. A Tube OD (inch)	Thread NPT	Part Number	Hex	D1	D2	D3	D4	L1	L2	M	Min. Flow Dia.	Wt. (g)	Bag/Box Quantity
1/4	1/8-27	KV2TF07-34	14.29	13.2	13.3	13.2	13.2	20.6	22.0	17	3.5	28	100/400
1/4	1/4-18	KV2TF07-35	17.46	13.2	13.3	13.2	13.2	20.6	25.5	17	3.5	36	100/400
3/8**	1/8-27	KV2TF11-34	17.46	17.9	18.1	17.0	17.9	26.0	19.0	21	5.4	18	100/200
3/8	1/4-18	KV2TF11-35	17.46	17.9	18.1	17.0	17.9	26.2	27.7	21	5.9	38	100/200
1/2	3/8-18	KV2TF13-36	22.23	21.7	22.1	17.0	17.9	28.8	30.1	22	8.5	57	100/200
5/8	1/4-18	KV2TF15-35	23.80	26.5	27.0	20.0	21.9	33.4	25.8	25	9.8	69	100/100

** Non-Standard Product, consult factory for lead time.

Union Tee
KV2T _ _ _


App. A Tube OD (inch)	App. B Tube OD (inch)	App. C Tube OD (inch)	Part Number	D1	D2	D3	D4	L1	L2	Q	MA	MB	MC	Min. Flow Dia.	Wt. (g)	Bag/Box Quantity
5/32	5/32	5/32	KV2T03-00	10.4	10.6	10.4	10.6	18.3	18.3	4.5	16	16	16	1.6	8	100/800
1/4	1/4	1/4	KV2T07-00	13.2	13.3	13.2	13.3	20.6	20.6	5.3	17	17	17	3.5	9	100/600
1/4**	1/4	3/8	KV2T07-11	17.9	18.1	17.9	18.1	26.2	26.2	6.6	17	17	21	3.5	21	100/200
3/8	3/8	3/8	KV2T11-00	17.9	18.1	17.9	18.1	26.2	26.2	6.6	21	21	21	5.4	23	100/300
3/8**	3/8	5/32	KV2T11-03	17.9	18.1	13.2	13.2	19.3	25.0	6.6	20.4	20.4	15.8	3.0	23	100/200
3/8**	3/8	1/4	KV2T11-07	17.9	18.1	13.2	13.3	22.3	25.0	6.6	20.4	20.4	16.8	4.6	23	100/400
3/8**	3/8	1/2	KV2T11-13	21.7	22.1	21.7	22.1	28.8	28.8	7.8	21	21	22	5.4	23	100/100
1/2	1/2	1/2	KV2T13-00	21.7	22.1	21.7	22.1	28.8	28.8	7.8	22	22	22	8.5	33	100/200
1/2**	1/2	3/8	KV2T13-11	21.7	22.1	21.7	22.1	28.8	28.8	7.8	22	22	21	5.4	33	100/100
5/8	5/8	5/8	KV2T15-00	26.5	27.0	26.5	27.0	33.4	33.4	10.0	25	25	25	9.8	57	50/100

** Non-Standard Product, consult factory for lead time.

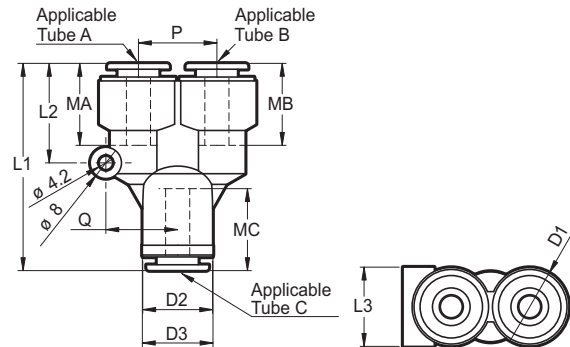
Male Branch “Y”
KV2U _ _ _S


App. A Tube OD (inch)	App. B Tube OD (inch)	Thread NPT	Part Number	Hex	D1	D2	D3	L1	L2	L3	A*	Q	P	MA	MB	Min. Flow Dia.	Wt. (g)	Bag/Box Quantity
1/4	1/4	1/8-27	KV2U07-34S	14.29	15.2	13.2	13.3	48.7	22.0	15.4	44.6	14.3	15.2	17	17	3.5	21	200/400
1/4	1/4	1/4-18	KV2U07-35S	14.29	15.2	13.2	13.3	52.7	22.0	15.4	46.9	14.3	15.2	17	17	3.5	28	200/400
1/4	1/4	3/8-18	KV2U07-36S	17.46	15.2	13.2	13.3	54.7	22.0	15.4	48.6	14.3	15.2	17	17	3.5	41	100/200
3/8	3/8	1/4-18	KV2U11-35S	19.00	20.1	17.9	18.1	64.4	25.5	20.3	58.6	18.4	20.1	21	21	5.4	43	100/200
3/8	3/8	3/8-18	KV2U11-36S	19.00	20.1	17.9	18.1	66.4	25.5	20.3	60.3	18.4	20.1	21	21	5.4	53	100/200
1/2	1/2	3/8-18	KV2U13-36S	23.8	23.9	21.7	22.1	70.9	29.5	24.1	60.0	22.0	23.9	21.8	21.8	8.5	60	50/100
1/2	1/2	1/2-14	KV2U13-37S	23.8	23.9	21.7	22.1	73.9	29.5	24.1	65.4	22.0	23.9	21.8	21.8	8.5	73	50/100

* Dimension A reference after installation.

KV2U _ _ _

Union “Y”



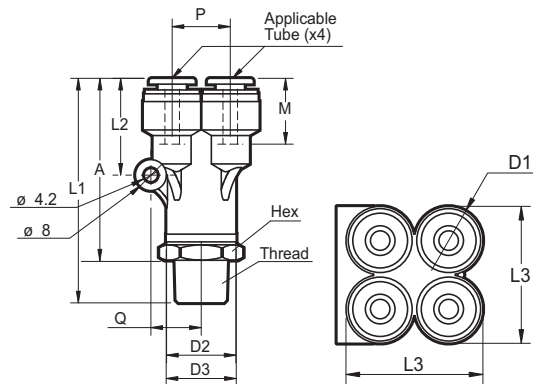
App. A Tube OD (inch)	App. B Tube OD (inch)	App. C Tube OD (inch)	Part Number	D1	D2	D3	L1	L2	L3	Q	P	MA	MB	MC	Min. Flow Dia.	Wt. (g)	Bag/Box Quantity
1/4	1/4	1/4	KV2U07-00	15.2	13.2	13.3	40.9	22.0	15.4	14.3	15.2	17	17	17	3.5	12	200/400
1/4	1/4	3/8	KV2U07-11	15.2	17.9	18.1	46.4	25.8	18.1	11.8	15.2	17	17	21	3.5	15	200/400
3/8	3/8	3/8	KV2U11-00	20.1	17.9	18.1	53.1	25.5	20.3	18.4	20.1	21	21	21	5.4	24	100/200
3/8	3/8	1/4	KV2U11-07	20.1	17.9	18.1	55.7	25.5	20.3	18.4	20.1	21	21	17	3.5	31	100/200
3/8**	3/8	1/2	KV2U11-13	23.7	21.7	22.1	55.8	29.2	24.1	22.0	23.9	21	21	22	5.4	42	100/100
1/2	1/2	1/2	KV2U13-00	23.9	21.7	22.1	55.8	29.0	24.1	22.0	23.9	22	22	22	8.5	37	100/100
1/2**	1/2	3/8	KV2U13-11	23.9	21.7	22.1	55.8	29.1	24.1	22.0	23.9	22	22	21	5.4	41	100/100
*5/8	5/8	5/8	KV2U15-00	28.9	26.5	27.0	66.4	34.4	29.1	27.7	28.8	25	25	25	9.8	79	50/50

** Non-Standard Product, consult factory for lead time.

Mounting hole dimensions differ for 5/8": ID=6.3, OD=12.0

KV2UD _ _ _ S

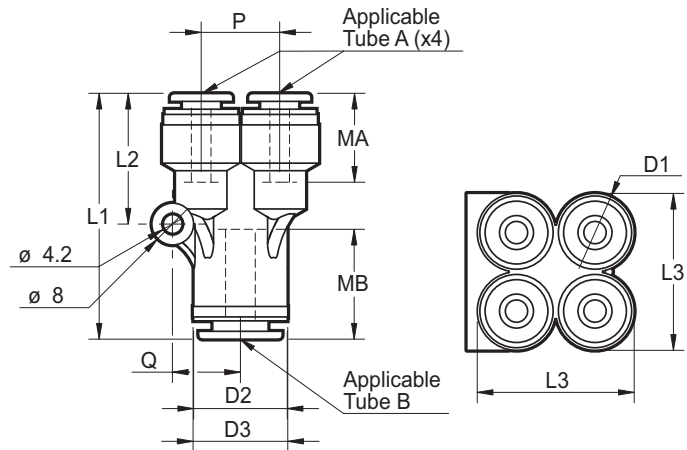
Male Double “Y”



App. Tube	Thread NPT	Part Number	Hex	D1	D2	D3	L1	L2	L3	P	Q	A*	M	Min. Flow Dia.	Weight (grams)	Bag/Box Quantity
1/4	1/4-18	KV2UD07-35S	19.00	15.2	17.9	18.1	57.5	25.0	30.6	15.2	12.1	51.7	17	3.5	46	100/200

Union Double “Y”

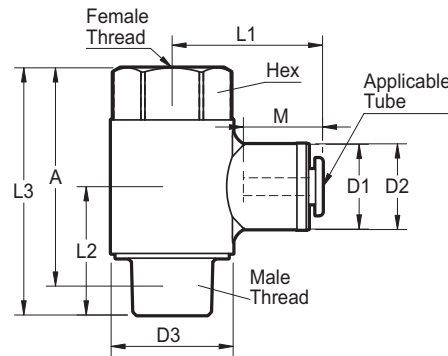
KV2UD _ _ _



Applicable A Tube	Applicable B Tube	Part Number	D1	D2	D3	L1	L2	L3	P	Q	MA	MB	Min. Flow Dia.	Weight (grams)	Bag/Box Quantity
1/4	3/8	KV2UD07-11	15.2	17.9	18.1	45.9	25.0	30.6	15.2	12.1	17	21	3.5	46	100/200

Universal Female 90° Elbow

KV2VF _ _ _ S



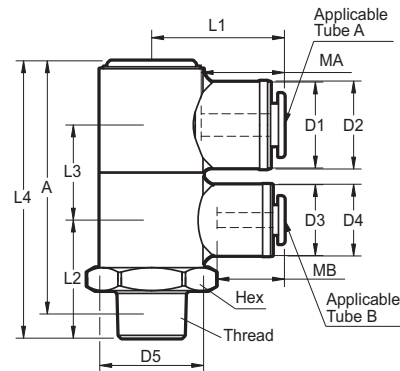
Applicable Tube OD (inch)	Male Thread NPT	Female Thread NPT	Part Number	Hex	D1	D2	D3	L1	L2	L3	A*	M	Min. Flow Dia.	Wt. (g)	Bag/Box Quantity
1/4	3/8-18	3/8-18	KV2VF07-36S2	22.23	17.9	18.1	26.2	32.3	27.1	52.2	46.1	17	3.5	87	100/200
3/8**	3/8-18	3/8-18	KV2VF11-36S	22.23	21.7	22.1	26.2	33.8	27.1	52.5	46.1	21	5.4	72	100/100
1/2**	3/8-18	3/8-18	KV2VF13-36S	22.23	21.7	22.1	26.2	33.8	27.1	52.5	46.1	22	6.3	89	100/100
1/4**	3/8-18	Male Hex.	KV2V07-36S	22.23	17.9	18.1	26.2	32.3	27.1	45.0	38.9	17	3.5	83	100/100
3/8**	3/8-18	Male Hex.	KV2V11-36S	22.23	21.7	22.1	26.2	33.8	27.1	45.0	38.9	21	5.4	54	100/100
1/2**	3/8-18	Male Hex.	KV2V13-36S	22.23	21.7	22.1	26.2	33.8	27.1	45.0	38.9	22	6.3	85	100/100

** Non-Standard Product, consult factory for lead time.

*Dimension A reference after installation.

KV2VD _ _ _ S

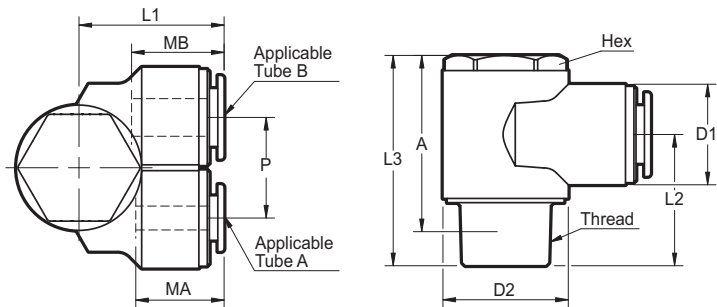
Male Double Universal 90° Elbow



App. A Tube OD (inch)	App. B Tube OD (inch)	Thread NPT	Part Number	Hex	D1	D2	D3	D4	D5	L1	L2	L3	L4	A*	MA	MB	Min. Flow Dia.	Wt. (g)	Bag/ Box Qty.
3/8	1/4	3/8-18	KV2VD11-07-36S3	23.8	17.9	18.1	13.2	13.3	26.2	33.5	29.8	24.0	70.0	63.9	21	17	3.5	138	50/100

KV2Z _ _ _ S

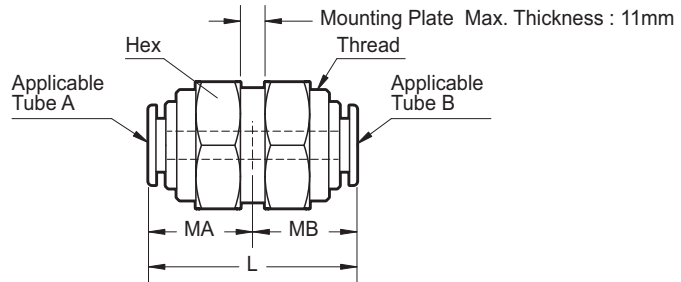
Male Branch Universal 90° Elbow



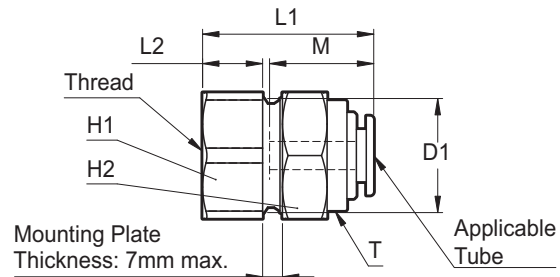
App. A Tube OD (inch)	App. B Tube OD (inch)	Thread NPT	Part Number	Hex	D1	D2	L1	L2	L3	A*	P	MA	MB	Min. Flow Dia.	Wt. (g)	Bag/Box Quantity
1/4	5/8	1/2-14	KV2Z07-15-37S	25.40	28.9	29.8	37.9	33.7	55.0	46.9	28.9	17	25	3.5	159	30/60
3/8	1/2	1/4-18	KV2Z11-13-35S	25.40	23.9	29.8	34.5	27.2	46.0	40.2	23.9	21	22	5.4	115	100/100
3/8	1/2	3/8-18	KV2Z11-13-36S1	25.40	23.9	29.8	34.5	28.2	47.0	40.9	23.9	21	22	5.4	120	100/100
3/8	1/2	1/2-14	KV2Z11-13-37S1	25.40	23.9	29.8	34.5	31.2	50.0	41.9	23.9	21	22	5.4	133	100/100
3/8	5/8	1/2-14	KV2Z11-15-37S	25.40	28.9	29.8	37.3	33.7	55.0	46.9	28.9	21	25	5.4	156	30/60
1/2	5/8	1/2-14	KV2Z13-15-37S	25.40	28.9	29.8	36.4	33.7	55.0	46.9	28.9	22	25	8.5	145	30/60

** Non-Standard Product, consult factory for lead time.

*Dimension A reference after installation.

Bulkhead Union
KV2E__-__


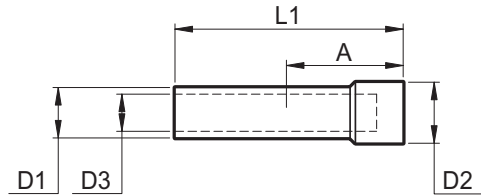
Applicable A Tube OD (inch)	Applicable B Tube OD (inch)	Part Number	Thread (UNF)	Hex	L	MA	MB	Mtg. Hole	Min. Flow Dia.	Wt. (g)	Bag/Box Quantity
5/32	5/32	KV2E03-00	1/2-20	17.46	32.1	16	16	13.5	1.6	32	100/400
1/4	1/4	KV2E07-00	9/16-18	17.46	34.1	17	17	15.0	3.5	30	100/400
3/8	3/8	KV2E11-00	7/8-14	25.40	42.1	21	21	23.0	5.4	87	100/100
1/2	1/2	KV2E13-00	1-12	28.57	44.1	22	22	26.0	8.5	117	100/100
5/8	5/8	KV2E15-00	1 1/8-12	33.33	50.0	25	25	29.0	9.8	191	50/50

Female Bulkhead Connector
KV2E__-__


Applicable Tube OD (inch)	Thread NPT	Part Number	T (UNF)	H1 (Hex)	H2 (Hex)	L1	L2	M	D1	Min. Flow Dia.	Wt. (g)	Bag/Box Quantity
5/32	1/4-18	KV2E03-35	1/2-20	17.46	17.46	31.0	14.7	16	13.5	1.6	36	100/400
1/4	1/8-27	KV2E07-34	9/16-18	17.46	17.46	27.5	9.8	17	15.0	3.5	32	100/400
1/4	1/4-18	KV2E07-35	9/16-18	17.46	17.46	32.4	14.7	17	15.0	3.5	36	100/400
3/8	1/4-18	KV2E11-35	7/8-14	25.40	25.40	34.5	12.1	21	23.0	5.4	90	100/100
3/8	3/8-18	KV2E11-36	7/8-14	25.40	25.40	36.9	14.5	21	23.0	5.4	91	100/100
1/2	3/8-18	KV2E13-36	1-12	28.57	28.57	37.1	13.7	22	26.0	8.5	120	100/100
1/2	1/2-14	KV2E13-37	1-12	28.57	28.57	41.2	17.8	22	26.0	8.5	124	100/100

KV2P- _ _

Plugs



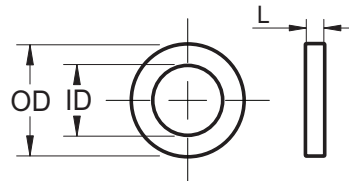
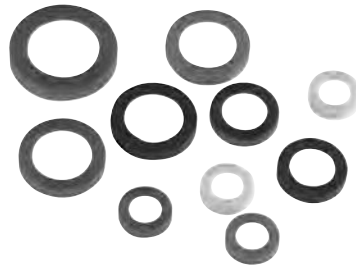
Applicable Tube (Inch)	Part Number	L	A*	D1	D2	D3	Weight (grams)	Bag/Box Quantity
5/32	KV2P-03	32.0	16.0	4.0	6.0	2.8	0.5	1000/2000
1/4	KV2P-07	35.0	18.0	6.4	8.5	4.5	1	1000/3000
3/8	KV2P-11	43.0	22.0	9.5	11.5	7.0	2	500/2000
1/2	KV2P-13	45.5	23.5	12.7	15.0	9.7	4	500/1000
5/8	KV2P-15	47.0	20.5	15.9	20.0	12.2	7	200/200
3/4	KV2P-19	56.0	22.6	19.1	24.0	14.7	12	200/200

*Dimension A reference after installation.

KQ2C- _ _ [_ _]

Color Caps

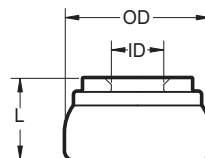
Code	Color
R	Red
YR	Orange
BR	Brown
Y	Yellow
G	Green
CB	Sky Blue
W	White
B	Black
GR	Grey
BU	Blue



Applicable Tube OD (Inch)	Part Number	OD	ID	L	Bag/Box Quantity
5/32	KQ2C-04[]	10.5	7.0	2.7	50/500
1/4	KQ2C-07[]	12.6	7.5	2.9	50/500
3/8	KQ2C-11[]	16.6	10.7	3.1	50/500
1/2	KQ2C-13[]	20.6	13.9	3.1	50/500
5/8	KQ2C-16[]	26.3	17.2	3.9	50/500

KR- _ _ C

Fitting Boots



Applicable Tube (Inch)	Part Number	OD	ID	L	Bag/Bag Quantity
1/4	KR-07C	16.0	5.8	9.0	10/100
3/8	KR-11C	20.3	9.0	10.5	10/100
1/2	KR-13C	24.3	12.2	10.5	10/100

All accessories not required to pass FMVSS 106

Ergonomic Tube Cutter**TK-4**

Use TK-4 Tube Cutter for 3/4" OD tubing or less.

Stainless Steel Replacement Blades - TK-4-BSS (10 pieces per package)

Carbon Steel Replacement Blades - TK-4-BCS (10 pieces per package)

Stainless Steel Replacement Spring - TK-4-SP01, Single Spring

Ergonomic Tube Cutter**TK-2**

TK-2 Tube Cutter (1/2" tubing or less)

Cartridges

Advantages

SMC Cartridges are a compact, economical design that allows the user to reduce the space and labor required to install and assemble a conventional pipe thread fitting connection.

The SMC Cartridge design allows for faster, easier installation of components and assemblies.

Advantages of the SMC Cartridge include weight reduction and ease of assembly. An external O-ring is preassembled on the SMC Cartridge to ensure a leak free installation. The SMC Cartridge includes a tube support.

Once the Cartridge is installed in an SAE cartridge cavity, no special tools are needed to connect tubing. Just bottom the tubing into the cartridge body for a positive seal.

Please reference page 16 for color cap specifications.

Applications

Cartridges are for air brake applications using SAE J844 type A and B Nylon tubing.

Cartridges meet FMVSS 571.106 and the SAE J2494-3 (End Fitting) and SAE J2494-4 (Cartridge Cavity) air brake performance specifications.

Cartridge Installation

Apply a light grease or oil, or silicone lubricant to cartridge O-ring. Use a tool that fits under the release button and presses on the cartridge brass shoulder.

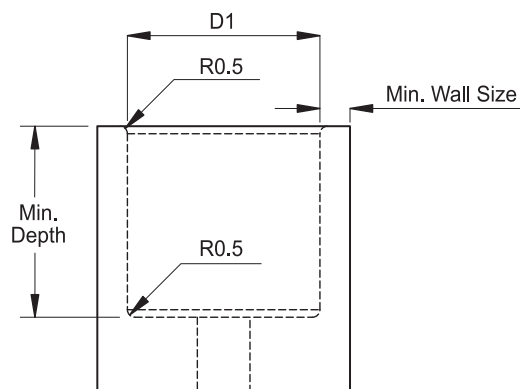
Apply pressure with an arbor press or assembly machine that will keep the cartridge concentric to the cavity during the installation. Press the cartridge into the cavity until the bottom of the shoulder makes contact with the cavity body.

Do not use excessive force or use improper equipment (hammer) when installing cartridges.

Materials

SMC Cartridges are designed to be installed into Aluminum (T-6061-T6) SAE cavities.

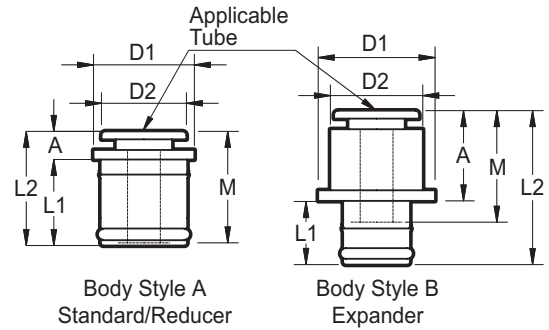
Cavity Sizes per SAE J2494-4



Cavity Size	App. Tube Size	Min. Depth	D1	Min. Wall
Q07	1/4" SAE	12.7	12.8 (±0.05)	2.0
Q11	3/8" SAE	16.5	16.5 (±0.05)	2.0
Q13	1/2" SAE	19.8	19.7 (±0.05)	2.0

Straight Cartridge

KV2H__-Q__



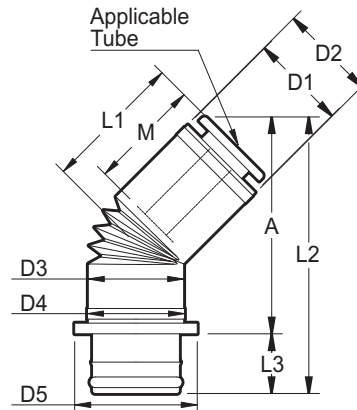
Applicable Tube (inch)	Cavity Size	Part Number	Body Style	L1	L2	A*	D1	D2	M	Reference Insertion Force (lbf)	Min. Flow Dia.	Wt. (g)	Bag/Box Quantity
1/4	1/4 SAE	KV2H07-Q07	A	12.4	17.9	5.5	16.0	12.0	17.0	674-786	3.5	8	100/800
1/4	1/2 SAE	KV2H07-Q13	A	12.7	17.8	5.1	23.0	12.0	17.0	674-786	3.5	29	100/400
3/8	1/4 SAE	KV2H11-Q07	B	12.0	29.0	17.0	22.0	17.4	21.0	674-786	5.4	19	100/200
3/8	3/8 SAE	KV2H11-Q11	A	16.2	21.5	5.3	19.0	16.0	21.0	786-899	5.4	11	100/600
3/8	1/2 SAE	KV2H11-Q13	A	16.2	21.2	5.0	23.0	16.0	21.0	674-786	5.4	26	100/200
1/2	3/8 SAE	KV2H13-Q11	B	14.5	31.9	17.4	26.0	22.0	22.0	674-786	8.5	32	100/200
1/2	1/2 SAE	KV2H13-Q13	A	17.3	22.4	5.1	23.0	20.0	22.0	674-786	8.5	15	100/200
5/8	1/2 SAE	KV2H15-Q13	B	15.1	35.0	19.9	29.0	25.7	25.0	674-786	9.8	48	100/200

Refer to page 18 for applicable cavity diameter and depth.

* Dimensions A reference after installation.

45° Elbow Cartridge

KV2K__-Q__



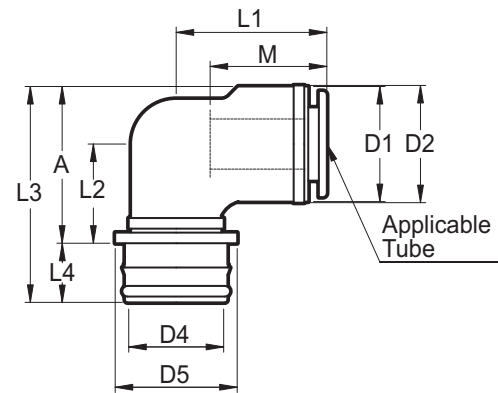
App. Tube (inch)	Cavity Size	Part Number	L1	L2	L3	A*	D1	D2	D3	D4	D5	M	Reference Insertion Force (lbf)	Min. Flow Dia.	Wt. (g)	Bag/Box Quantity
1/4	1/4 SAE	KV2K07-Q07	19.0	38.7	9.7	29.0	13.2	13.3	13.2	13.2	19.0	17	674-786	3.5	19	100/400
3/8	1/4 SAE	KV2K11-Q07	26.2	50.4	9.7	40.7	17.9	18.1	17.9	18.2	23.0	21	674-786	5.4	26	100/400
3/8	3/8 SAE	KV2K11-Q11	26.2	51.9	11.2	40.7	17.9	18.1	17.9	18.2	23.0	21	786-899	5.4	32	100/200
1/2	3/8 SAE	KV2K13-Q11	28.8	56.8	11.2	45.6	21.7	22.1	21.7	22.0	27.0	22	786-899	8.5	41	100/200
1/2	1/2 SAE	KV2K13-Q13	28.8	56.8	11.2	45.6	21.7	22.1	21.7	22.0	27.0	22	674-786	8.5	51	100/200
5/8	3/8 SAE	KV2K15-Q11	29.6	57.4	11.2	46.2	26.5	27.0	20.9	21.9	26.0	25	786-899	9.8	48	100/200
3/4	3/8 SAE	KV2K19-Q11	39.1	72.2	11.2	61.0	32.6	32.9	26.2	27.0	32.0	33	786-899	9.8	82	50/100

Refer to page 18 for applicable cavity diameter and depth.

* Dimensions A reference after installation.

KV2L__-Q__

90° Elbow Cartridge



App. Tube (inch)	Cavity Size	Part Number	D1	D2	D3	D4	D5	L1	L2	L3	L4	A*	M	Reference Insertion Force (lbf)	Min. Flow Dia.	Wt. (g)	Bag/Box Quantity
1/4	1/4 SAE	KV2L07-Q07	13.2	13.3	13.2	13.2	19.0	20.7	14.6	30.9	9.7	21.2	17	674-786	3.5	20	100/400
3/8	1/4 SAE	KV2L11-Q07	17.9	18.1	17.0	17.9	23.0	25.9	16.8	35.5	9.7	25.8	21	674-786	5.4	24	100/200
3/8	3/8 SAE	KV2L11-Q11	17.9	18.1	17.0	17.9	23.0	25.9	16.8	37.0	11.2	25.8	21	786-899	5.4	31	100/200
1/2	3/8 SAE	KV2L13-Q11	21.7	22.1	17.0	17.9	23.0	28.4	18.7	40.7	11.2	29.5	22	786-899	8.5	35	100/200
1/2	1/2 SAE	KV2L13-Q13	21.7	22.1	17.0	17.9	23.0	28.4	18.7	40.7	11.2	29.5	22	674-786	8.5	43	100/200

Refer to page 18 for applicable cavity diameter and depth.

* Dimensions A reference after installation.

DOT/J844 Nylon Tubing

TIV _ _ _ - _ _

- For Use in Air Brake Systems on Heavy Duty Vehicles
- All Colors are Available in All Tube Sizes
- Cold and Heat Stabilized
- UV Resistant

Specifications

Recommended Operating Fluid	Air								
Maximum Operating Pressure	145psi (1.0MPa)								
Recommended Operating Temperature*	-40°F to 140°F (-40°C to 60°C)								
Specifications	FMVSS 571.106								
	Performance requirements of SAE J2494-3, and SAE J844 (Type A or B)								
Tube O.D.	1/8"	5/32"	3/16"	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"
Minimum Bending Radius (mm)	9.4	12.7	19.1	25.4	31.8	38.1	50.8	63.5	76.2
Minimum Burst Pressure (psi) at 24°C (75°F)	1000	1200	1200	1200	1000	1000	950	900	800
Material	Nylon 12 (Polyamide)								

*Note: Recommended operating fluid and temperature range provides best performance and longest life. Products are tested from -40°F to 200°F (-40°C to 93°C) per FMVSS 49CFR571.106.

How to Order

Tube Model •

TIV 07 B — 33

Length per Roll

Meters	See Packaging Table below. Not Available in all sizes and all colors.
33	
77	
153	
305	

Conversion

33 Meters = 108 Feet
77 Meters = 252 Feet
153 Meters = 500 Feet
305 Meters = 1000 Feet

Tube Size •

01	1/8"
03	5/32"
05	3/16"
07	1/4"
09	5/16"
11	3/8"
13	1/2"
15	5/8"
19	3/4"

Color Indication •

Symbol	Color
B	Black
R	Red
G	Green
BU	Blue
W	White
Y	Yellow
YR	Orange
N	Natural
S	Silver
PU	Purple
BR	Brown
GD	Dk. Green
GR	Gray
T	Tan

Packaging Table

	Tube Size																			
	Type "A" (Monowall)								Type "B" (Reinforced)											
	TIV01 1/8"		TIV03 5/32"		TIV05 3/16"		TIV07 1/4"		TIV09 5/16"		TIV11 3/8"		TIV13 1/2"		TIV15 5/8"		TIV19 3/4"			
Length (Meters)	33	77	153	305	33	77	153	305	33	77	153	305	33	77	153	305	33	77	153	305
B Black				S				S				S				S				S
R Red				S				S				S				S				S
G Green				S				S				S				S				S
BU Blue				S				S				S				S				S
W White				S				S				S				S				S
Y Yellow				S				S				S				S				S
YR Orange								S				S				S				S
N Natural				S				S				S				S				S
S Silver								S				S				S				S
PU Purple												S				S				S
BR Brown												S				S				S
GD Dk. Green												S				S				S
GR Gray												S				S				S
T Tan												S				S				S

S = Standard, all other length color combinations are available by special order

Tube Sizes

1/8" 5/32" 3/16" 1/4" 5/16" 3/8" 1/2" 5/8" 3/4"

KV2 Instructions

Installation



Insert the KV2 series fitting into port and rotate until hand tight.



Using approved assembly method, tighten KV2 fitting to SMC recommended torque specifications. (see below)



Rotate KV2 series fitting to desired location.

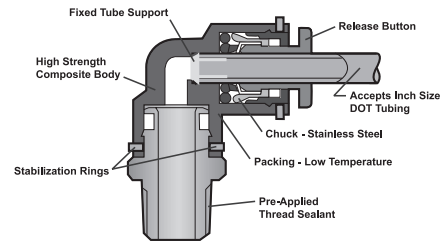


Insert DOT approved tubing into the KV2 series fitting until the tube bottoms out.



Gently pull back on tubing to engage the gripping teeth into the tube.

Features



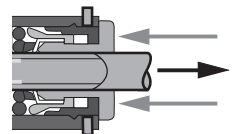
Removal

Caution

Release system air pressure from air tanks prior to removing any KV2 fittings or DOT tubing.



Push in guide to remove tube from KV2 series fitting.



Depress and hold the release button against the fitting body, then remove tubing.



Remove KV2 series fitting from the fitting port with approved wrench.

KV2 Torque Specifications

Thread NPT	Standard Thread Torque (in-lbs)
1/8"	62 to 80
1/4"	106 to 124
3/8"	195 to 212
1/2"	248 to 266
3/4"	248 to 266
Stud end into metallic ports	

Metallc: Aluminum, zinc, stainless steel, and brass

Important Information

DOs

- 1** Tighten fitting by hand. Apply final torque with a torque wrench at the hex.



- 2** Cut tubing square with a clean 90° edge



- 3** Use SMC Tube Cutters, TK-4 is shown.



- 4** Allow adequate bend radius of tube



- 5** Use a *push-push* action until the tube bottoms out. Use a *pull* action to set the chuck into the tube.



DON'Ts



- 1** Don't use a wrench on the fitting plastic body.



- 2** Don't use an excessive tube angle cut which can lead to leakage or breaking.



- 3** Don't use dikes, a knife, a saw or a dull tool to cut the tubing. Avoid burrs, dirt, and anything that can lead to leakage or breaking.



- 4** Don't kink the tubing or apply excessive side load which can cause leaks.



- 5** Don't allow contaminants to enter fittings, cartridges, or tube.

- 6** Don't attempt to disassemble tubing from fitting with the vehicle air system under pressure.

Specific Precautions for Fittings on Vehicles

**Be sure to read and understand this publication carefully before using product.
Please refer to instructions and precautions.**

Introduction

The products specified in this catalog are unlike other SMC products and developed specifically for mounting on vehicles and require reading and understanding of the "Safety Instructions," "Common Precautions" and "Warnings".

These instructions indicate the level of potential hazard with the labels of "Caution", "Warning" or "Danger". They are all important notes for safety and must be followed in addition to the regulations published by the U.S. Department of Transportation (D.O.T.)

Definitions

Caution: Operator error could result in injury or equipment damage.
Warning: Operator error could result in serious injury or loss of life.
Danger: In extreme conditions, there is a possibility of serious injury or loss of life.

Warning:

The compatibility of the product is the responsibility of the original equipment manufacturer (OEM). Since the product specified here is used under various operating conditions, its compatibility with specific equipment must be decided by the OEM who designs the equipment or decides its specifications based on necessary analysis and test results. The expected performance and safety assurance of the equipment will be the responsibility of the OEM who has determined its compatibility with the product. The inspection and maintenance of machinery/equipment should only be performed after measures to prevent falling objects and prevention of any runaway of driven objects have been confirmed.

Caution:

The Product is provided for use in vehicle manufacturing industries. If considering using the product in other industries or applications outside vehicle manufacturing please consult with SMC before specifying and using the product.

Design and Selection

Warning:

1. Confirm specifications.
The product is designed for use in compressed air applications. Do not use the product at pressures and temperatures outside the specified range, which can cause breakage or operational failure of the product. Any damage due to using the product outside the specified range will not be warranted or guaranteed.
2. Do not use the product for the connection between a driveshaft and chassis and/or between a truck and trailer.
3. Do not use the product in applications in which the tube is swiveled or turned. Such application can damage the fitting.
4. Installation of a tube at less than the minimum listed bending radius may give a mechanical load to the product and significantly reduce the tube life or cause failure. When establishing a proper tube length, motion adsorption, pressure effect, machine tolerance, gravity direction and movement must be considered. Minimum tube bending radius is defined by 49CFR571.106.
5. Installation of a tube at less than the recommended bending radius may significantly reduce the product's life. Particular attention must be given to prevention of sharp bending of the tube to the fitting juncture. Any bending during installation at less than the minimum bending radius must be avoided. If a tube is kinked during installation, the tube must be discarded. Any tube that has been kinked or bent to a radius smaller than the minimum bending radius must be discarded.
6. Ensure tube is restrained, protected or guided properly. A tube of a longer length should be restrained, protected or guided to protect it from damage by unnecessary flexing, contact with other equipment, excessive load to a fitting to avoid personal injury or property damage that will be caused if a failure causes the tube to explode or dislodge. Care must be taken to insure such restraints do not introduce additional stress or wear points.
7. The product is designed for static piping. If it is used with moving tubing such as a cable bare, care must be taken with the tube for possible sliding abrasion, elongation or breakage due to tensile force and disconnection from fitting.

8. Confirm PTFE acceptable

The product contains PTFE (poly tetra ethylene resin) powder into the seal of the threads. Confirm there will not be a compatibility problem with the PTFE material.

Caution

1. Before Piping, make sure all debris, cutting oil, dust, etc. are removed from piping.
2. Prior to assembly, a careful examination of the product regarding the following items must be performed:
 - a) Do not use any product that displays signs of nonconformance.
 - b) Correct size
 - c) No presence of dirt, obstructions, scratches, blisters, looseness, cracks and other visible defects
 - d) No presence of burrs, cracks, corrosion and other defects on the sealing surface.
3. Tighten with an appropriate wrench, using hexagonal face of the body of the product. Position the wrench as close to the thread as possible. Tightening with a wrench of the wrong size, or too close to the tube side may cause damage or deformation of a fitting. After mounting check that the fitting is not damaged or deformed.
4. When connecting a tube consider factors such as changes in tube length due to pressure and allow sufficient margin. Otherwise this can cause damage to the fitting and disconnection of the tube from the fitting.
5. Do not bend tube over the minimum bending radius during installation. Any tube that has been kinked or bent to a radius smaller than recommended minimum bending radius must be discarded.
6. Mount the product such that a fitting and tube are not subjected to twisting, pulling or moment loads. This can cause damage to the fitting and crushing, bursting or disconnection of the tube.

Air Supply

Warning

1. Operating fluid - Compressed air only.
2. Quality of Air - Under the following conditions, the product could break or cause operation failure. Customer is responsible to test and analyze the product to ensure it is compatible chemically with condensate contained in the air to be supplied through the product. If this is not possible the product should not be used:
 - Compressed air is contaminated with chemicals, synthetic materials containing organic solvents, salts and corrosive gases.
 - Condensate that include oil, moisture or other chemicals drained from air compressor and intermediate equipment cannot be removed.

Specific Precautions for Fittings on Vehicles (Continued)

**Be sure to read and understand this publication carefully before using product.
Please refer to instructions and precautions.**

Selection

Warning

1. Tube, tube assemblies and fittings (hereinafter referred to as the "product") can and do fail without warning for many reasons. Design all systems and equipment in a fail-safe mode so that failure of the product will not endanger persons or property. Do not use the product in the system or equipment without a fail-safe mode.
2. Do not use the product for the connection between a car shaft and chassis and between a truck and trailer. Such use is illegal to FMVSS (DOT) 106, the regulation published by the Department of Transportation in the US.

Caution

1. Do not select or use the product without thoroughly reading and understanding this catalog.
2. Due to the wide variety of operating conditions and applications for the product, SMC and its distributors do not represent or warrant that any particular product is suitable for any specific end use system. The user, through its own analysis and testing, is solely responsible for final selection of the product according to the following requirements.
 - Assuring that the user's requirements are met and the application presents no health or safety hazards.
 - Providing all appropriate health and safety warnings on the equipment on which the product is used.
 - Assuring compliance with all applicable government and industry standards.
3. Consult with SMC for any question and additional information.

Mounting and Piping

Caution

1. Prior to assembly, a careful examination of the product about the following items must be performed. Do not use any product that displays any signs of nonconformance.
 - Correct size and dimensions
 - No presence of dirt, obstructions, scratches, blisters, looseness, cracks and other visible defects
 - No presence of burrs, cracks, corrosion and other defects on the sealing surface
2. Do not assemble the product on another manufacturer product except the following cases.
 - When SMC approves the assembly in writing.
 - When the user verifies the assembly or application through analysis and testing.

(The user is solely responsible for the selection of the assembly.)
3. Installation of tubing at bending less than required by 49CFR571.106 may give a mechanical load to a fitting and significantly reduce the tube life or cause a failure. When establishing a proper tube length, motion absorption, pressure effect, machine tolerance, gravity direction and movement must be considered.
4. Installation of tubing at bending less than required by 49CFR571.106 may significantly reduce the product life. Particular attention must be given to preclude sharp bending at the tube to fitting juncture. Any bending during installation at less than the minimum bending radius must be avoided. If any tube is kinked during installation, the tube must be discarded. Any tube that has been kinked or bent to a radius smaller than the minimum bending radius must be discarded.
5. A tube of a longer length should be restrained, protected or guided to protect it from damage by unnecessary flexing, contact with other equipment, excessive load to a fitting, and to avoid personal injury or property damage that will be caused if a failure causes the tube to explode or break loose. Care must be taken to insure such restraints do not introduce additional stress or wear points.
6. After the product is mounted and a system is completed, operate the system at maximum operating pressure and check for possible malfunctions and leaks. Personnel must avoid potential hazardous areas while testing and using the system.

Operating Environment

Caution

1. The recommended fluid and ambient temperature is -40°F to 140°F. Use above or below the recommended limit can damage a fitting or tear a tube, or cause the tube to come off from the fitting, and finally degrade them to a point where the fluid may be released. Properly insulate and protect the product when they are exposed to temperatures above or below recommended range.
2. When the product is routed near heat sources (such as a high temperature manifold or melted metal), it can become overheated and break without direct contact to the heat source. This can occur even if there is cool air around the product. This is generally called radiation heat. If there is potential exposure to radiative heat, the product must be properly insulated and protected.
3. Care must be taken to insure that the product is either compatible with or protected from the environment (that is, surrounding conditions) to which it is exposed. Environmental conditions (including but not limited to ultraviolet radiation, sunlight, heat, ozone, moisture, water, salt water, chemicals and air pollutants) can cause degradation and premature failure.
4. Care must be taken to protect the product from mechanical loads (external forces). External forces can significantly reduce its life or cause a failure. Mechanical loads which must be considered include excessive flexing, improper tube length (too short or too long), twist, tensile or side loads, bend radius, vibration and swiveling (relative motion of components).
5. Condensates contain oil, moisture and other chemicals drained from air compressors and intermediate equipment. The user is solely responsible for insuring that the product is chemically compliant with the condensates by analysis and testing, and taking measures. Page 26 shows a reference to check the compliance.

Maintenance

Caution

1. Even with proper selection, mounting and installation, the product life may be significantly reduced without a continuing maintenance program. The severity of the application, risk potential from a possible product failure, and experience with any product failures in the application or in similar applications should determine the frequency of the inspection and the replacement for the products so that products are replaced before any failure occurs. A maintenance program must be established and followed by the user and, at minimum, must include the following 2 through 5 items.
2. Any of the following conditions require immediate shut down and replacement of the product.
 - Abraded and cut tube
 - Hard, stiff, heat cracked or charred tube
 - Heat cracked or charred plastic parts used on fitting
 - Cracked, damaged or badly corroded fitting
 - Leaks at fitting or in tube
 - Crushed or flattened fitting
 - Crushed or flattened tube
3. The following items must be tightened, repaired, corrected or replaced as required.
 - Leaks at the connected part of fitting with a port
 - Excess dirt build-up
 - Worn clamps, guards or shields
4. Operate the system at maximum operating pressure of the SMC product and check for possible malfunctions and leaks. Personnel must avoid potential hazardous areas while testing and using the system.
5. Plastic or elastomeric components used on the product will eventually age, harden, wear and deteriorate under thermal cycling and compression set. These parts should be inspected and replaced at specific replacement intervals, based on previous service life, government or industry recommendations, or when failures could result in unacceptable downtime, damage or injury risk.

Chemical Resistance Chart

One Touch Fittings

Key	□	Highly Resistant
	○	Gradually Corrodes (depends on operating conditions)
	◆	Moderately Corrodes (depends on operating conditions)
	■	Not Recommended for High Concentrations & Exposure
	■	Easily Corroded - Inapplicable

Test results are based on total saturation at room temperature.

Parts Description	Body Stud Guide	Body	Chuck	Release Bushing Collet	O Ring Packing	Sealant	For Reference	For Reference
Material	Brass C360	PBT	Stainless Steel SUS304	POM	NBR	Fluorine Acrylic	Nylon 11 Nylon 12	Nylon 6/6
Chemicals								
Acetone	□	○	○	○	■		○	□
Alcohol	□	□	○	□	□	○	○	□
Alcohols - Amyl	○	□	○	□	◆		○	□
Alcohols - Butyl	○	○	○	○	○		○	□
Alcohols - Ethyl	□	□	○	□	□		○	○
Alcohols - Isopropyl	○	□	○	□	○	◆	○	○
Alcohols - Methyl	□	○	○	○	○		○	○
Aluminum Nitrate	◆	○	◆	○	○		○	○
Aluminum Sulfate	■	○	○	□	□		□	□
Ammonium Phosphate	◆	○	○	○	□		□	□
Ammonium Sulfate	◆	○	○	□	□		□	□
Benzene (Benzol)	□	○	□	○	■	◆	□	□
Calcium Chloride	○	□	□	□	□	○	□	□
Carbon Tetrachloride	○	□	○	○	◆	■	■	□
Compressor Oil	□	□	□	□	□	○	□	□
Diesel Fuel	□	□	□	□	○	○		
Ether	◆	◆	◆	◆	◆	◆		
Ethyl Acetate	◆	○	○	○	■		□	□
Ethyl Alcohol	□	□	□	□	○		■	■
Ethylene Glycol	○	□	○	□	□		□	□
Formaldehyde	○	□	□	○	○		○	○
Gasoline	○	□	○	□	○	○	□	□
Glycerin	□	□	□	○	□		□	□
Heptane	□	□	□	□	○		○	○
Hexane	○	□	○	□	□	◆	□	□
Hydrochloric Acid 10%	■	○	■	■	○	■	■	■
Hydrogen Peroxide	■	○	○	■	■	◆	○	○
Kerosene	□	□	□	□	□		□	□
Linseed Oil	○	□	□	□	□	□	□	□
Lubricating Oil	○	□	□	□	□	□	□	□
Machine Oil	□	□	□	□	□	□	□	□
Methyl Ethyl Ketone	○	○	○	○	■		□	□
Mineral Oil	○	□	○	□	□		□	□
Motor Oil	□	□	□	□	○		○	○
Naphtha	○		○	○	○	○	□	□
Nitrate 10%	■	■	○	■	■	■	◆	◆
Olive Oil	□	□	□	□	□		□	□
Ozone	□	○	○	○	■		◆	◆
Ozone Low Concentration	□	□	□	□	○		○	○
Petroleum	○	○	□	○	○		□	□
Petroleum Oils	○	□	○	□	□		□	□
Salt Water	■	◆	◆	□	□	◆		
Soapy Water	□	□	□	□	□	○	□	□
Sodium Chloride	○	□	○	□	□	○	□	□
Sodium Nitrate	○	○	○	○	○		□	□
Sodium Sulfide	○	○	○	□	□		□	□
Sulfuric Acid (H ₂ SO ₄) 10%	■	○	◆	■	■	◆	◆	■
Toluene	□	○	□	○	■	◆	○	□
Turpentine	○	○	○	○	□	◆	□	□
Urea	○	○	○	□	◆		□	□
Water	○	□	○	□	□	○	□	□
Zinc Chloride	■	○	◆	◆	□		○	○
Zinc Sulfate	◆	○	○	○	□		■	◆



SMC Corporation of America
10100 SMC Boulevard
Noblesville, IN 46060

Terms of Sale

SMC Corporation based in Japan and its wholly owned subsidiary SMC Corporation of America (collectively "SMC") as well as any affiliates, subsidiaries or related companies of SMC submit this Statement of Warranty/Limitation Liability/Limitation of Remedy/Disclaimer of Warranty (Statement) to their Prospective Customers and Users of their products downstream from their Prospective Customers (collectively Prospective Customers and Users are referred to as "Customers") to set forth clearly SMC's obligations under the Uniform Commercial Code and any other applicable laws.

Limited Express Warranty. Subject to the limitations set forth in Paragraph 2 below, SMC Corporation of America (SMC) warrants to its Customers that the KV2 series and TIV series (Product(s)) manufactured or supplied by SMC shall be free from defects in workmanship and materials, and shall reasonably conform to the Specifications, Warnings, and Precautions for each product(s) contained within SMC published documentation which includes, but is not limited to, catalogs, drawings, and operations manuals, for a period of one (1) year from the date the Product(s) are delivered to its Customer.

Disclaimer of Warranty. THE FOREGOING LIMITED EXPRESS WARRANTY PROVIDED IN THIS PARAGRAPH AND THE OBLIGATIONS AND LIABILITIES OF SMC THEREUNDER, TO ITS CUSTOMERS ARE THE SOLE AND EXCLUSIVE LIMITED EXPRESS WARRANTY AND ARE IN LIEU OF ALL OTHER WARRANTIES, GUARANTEES OR LIABILITIES, EXPRESSED OR IMPLIED, ARISING BY LAW OR OTHERWISE INCLUDING WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. TO THE FULLEST EXTENT PERMITTED BY LAW, IN NO EVENT SHALL SMC BE RESPONSIBLE OR LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR OTHER DAMAGES, CLAIMS OR COST ARISING FROM ANY PRODUCT DEFECT.

Limitations of Warranty Obligations. The warranty obligations of SMC under Paragraph 1 of this Statement shall not apply and will automatically become null and void if: (a) the Product(s) are not properly installed under the SMC manufacturer-recommended conditions, if any, (b) the Customer uses the Product(s) in a manner not intended by SMC, (c) the Customer mis-uses the Product(s), (d) the Customer alters or modifies the Product(s), (e) the Customer fails to present the warranty claim during the Warranty Period, or (f) the Customer fails to comply with the SMC procedure for making warranty claims or fails to aid SMC in processing the warranty claim. The terms and conditions stated in this Statement may not be modified, altered or changed by any prior or subsequent written or oral communications or documents unless such modifications, alterations or changes are stated in a written document executed by officer of SMC.

Limitation of Remedy and Warranty Claims. If the Customer determines a Product(s) has a defect in materials and/or workmanship or fails to reasonably conform with the Specifications prior to the expiration of the Warranty Period, the Customer shall return such Product(s) (along with the original purchase order number and a written explanation of the defect or nonconformity) to SMC. Within a reasonable time of SMC's receipt of such Product(s), SMC shall replace or repair the defective Product(s) free of charge. Product(s) repair or replacement shall be the Customer's sole legal remedy under SMC's limited express warranty for the Product(s) and shall be SMC's sole obligation relative to the Product that is defective or non-conforming. In addition, any returned product must be received by SMC prior to expiration of the Warranty Period to make a valid warranty claim. SMC shall not be responsible or liable for any incidental, consequential or other damages, claims or costs arising from any product defect.

Federal Standards. The Customer represents and attests that procedures and processes used by it in any manufacture by it that utilizes SMC Product(s) conform to all applicable standards, rules and regulations promulgated by any government authority at the federal, state or local level, including, but not limited to, the National Transportation Safety Regulations issued by the Department of Transportation, FMVSS 49 CFR 571.106.

Return Policy

KV2 Warranty:

SMC Corporation of America (SMC) products listed for sale in this catalog are warranted to be free from defects in materials and workmanship for a period of one (1) year after the date of purchase (the "Warranty Period"). Provided purchaser installs, operates and maintains the products in accordance with all SMC application guidelines and customary industry practices.

Notice of Warranty Claims:

If purchaser determines a product has a defect in materials or workmanship prior to expiration of the Warranty Period, and desires to make a warranty claim, purchaser shall return such product (along with the original purchase order number) to the nearest SMC sales office or authorized distributor, postage or delivery charges prepaid. Any returned product must be received by SMC prior to expiration of the Warranty Period to make a valid warranty claim. The back page of this brochure lists current SMC addresses for product returns.

Response to Claims and Remedies:

All products timely returned to SMC may be inspected, tested or otherwise examined by SMC in its sole discretion, and SMC shall forward to purchaser written notice (via facsimile or otherwise) of such determination within thirty (30) days following SMC's receipt of product. In the event SMC determines a product is defective, SMC shall at purchaser's option: (i) replace the defective product free of charge; or (ii) provide a credit in the amount of the original purchase price to purchaser against future product purchases from SMC. Product replacement or purchase price credit shall be purchaser's sole legal remedy under this warranty.

Limited Warranty:

Other than the express warranty described above, there are not express or implied warranties made by SMC with the respect to the products in this brochure. The warranty given herein expressly EXCLUDES any warranty of merchantability or fitness for a particular purpose, and there are not warranties which extend beyond the description on the face hereof. To the fullest extent permitted by law, in no event shall SMC be responsible or liable for any incidental, consequential, or other damages, claims or costs arising from any product defect. The warranty provided herein shall be governed by and construed in accordance with the laws rules thereof, and any legal proceeding related to the products or this warranty shall be filed in a federal or state court of competent jurisdiction located in Hamilton County, Indiana.

Additional Information:

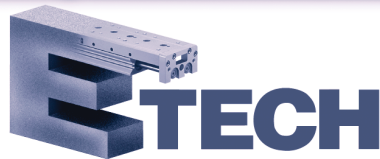
Questions regarding SMC products and warranty information may be directed to purchaser's sales representative at representative's current place of business, or to SMC Claims Department in writing at the following address:

SMC Corporation of America
ATTN: Claims Department
10100 SMC Boulevard
Noblesville, IN 46060

No response to any inquiry shall be interpreted to restrict, expand or modify the warranty described herein.

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



Key Features

- Multiple methods of Product Selection
- Part Number Validation
- Preview and Download 2D & 3D CAD Models Online with Real-time Updating
- Save Parts into a Custom Parts List
- Email Parts Lists to Internal Groups (Purchasing, Maintenance) or External (Partner Companies, SMC Sales Representatives)

Select a Product, Your Way



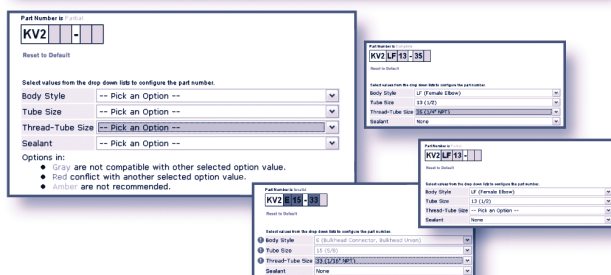
- Explore Products by Category by Clicking "Get Started"
- Use "Browse Catalog" for Visual Product Selection
- Enter a Part Number or Partial Part Number

Render & Update 2D & 3D CAD Models in Real-Time



- View and Download 2D & 3D CAD Models
- Files Available in Multiple Formats, including SolidWorks, Catia, and others, compatible with Virtually any CAD System
- CAD Model will match the Part you have Designed and Validated
- CAD File can be Saved or Placed Directly into your Project Design

Validate Your Part Number



- Design a Custom Part Easily and Accurately with E-Tech's Part Number Validation
- Allows user to Build Part Numbers by Choosing Options through a Series of Pull-Downs
- E-Tech lets you know if a Part is Incomplete or Incompatible by Flagging it as either "Partial" or "Invalid"

Save & Send Custom Parts



- Click "Save Part" and add your newly Designed and Validated Part to your Favorites List
- Email Part to Co-Workers or Send it to your SMC Representative for a Quote

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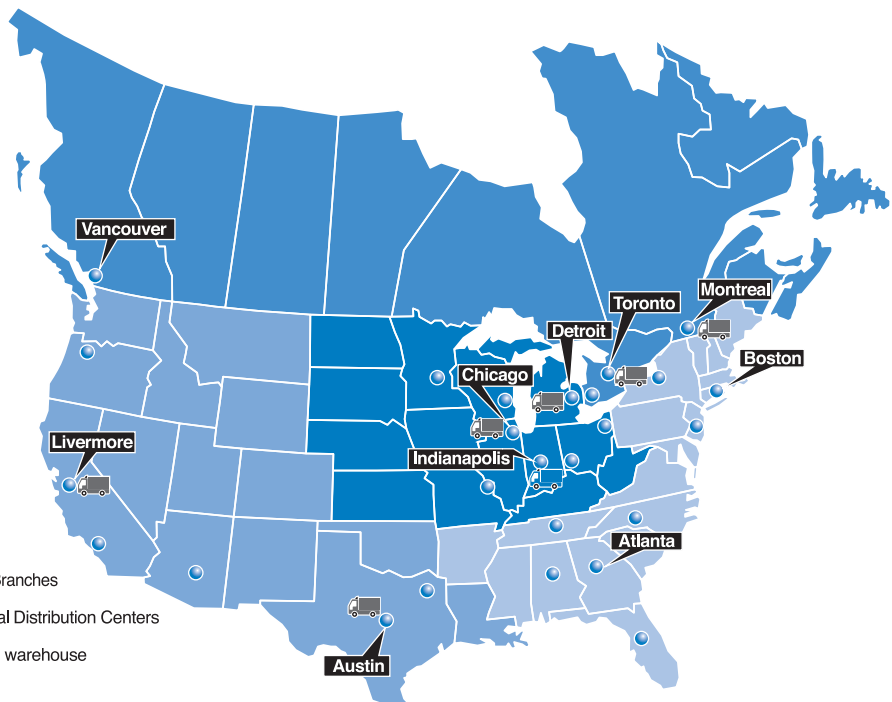
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