

Heavy Duty Differential Pressure Flowmeters



measuring
•
monitoring
•
analyzing

KEL



- Rugged Metal Construction
- Flow Rates up to 2000 GPM
- Linear Scales
- For Horizontal or Vertical Pipes
- Threaded or Wafer Style Fittings
- Able to Withstand High Pressure Surges
- Easy to Maintain
- Ranges Can Be Modified in the Field
- Optional Alarms and/or 4-20 mA/Frequency Outputs
- Analog Rate or Digital Rate/Total Displays
- Metric Ranges and BSP Threads Available



KOBOLD companies worldwide:

ARGENTINA, AUSTRALIA, AUSTRIA, BELGIUM, BULGARIA, CANADA, CHILE, CHINA, COLOMBIA, CZECH REPUBLIC, EGYPT, FRANCE, GERMANY, HUNGARY, INDIA, INDONESIA, ITALY, MALAYSIA, MEXICO, NETHERLANDS, PERU, POLAND, REPUBLIC OF KOREA, ROMANIA, SINGAPORE, SPAIN, SWITZERLAND, TAIWAN, THAILAND, TUNISIA, TURKEY, UNITED KINGDOM, USA, VIETNAM

KOBOLD Instruments, Inc.
1801 Parkway View Drive
Pittsburgh, PA 15205
Main Office:
1.800.998.1020
1.412.788.4890
info@koboldusa.com
www.koboldusa.com



Description

The KOBOLD KEL series flowmeters are designed specifically for applications with difficult environments. Metal housings, insensitivity to magnetic fields, and the ability to withstand large overpressures without damage, combine to make the KEL a tough performer. Designed with the industrial user in mind, the KEL is easy to use, read, and maintain.

Easy to Use

The KEL's design addresses three key usage issues. To protect the sensing mechanism; the pressure diaphragm's deflection is stopped by contact with the body of the sensor housing. This means that the membrane is not subject to mechanical damage during overpressure events such as surges or "water hammer." Aside from inlet/outlet requirements, location of meter installation is not an issue from a mechanical standpoint. The brass and brass-cast iron KEL meters feature an orifice mechanism which does not require recalibration after replacement. Repairs or scale changes can be made easily by the user in the field. There is no need to return the meter to the factory. On a KEL with switches, actuation occurs through direct contact with the pressure diaphragm's mechanical linkage. This reliance on direct contact, rather than magnetic coupling, makes the KEL ideal in applications which normally cause magnet failure due to the presence of large electro-magnetic fields.

Easy to Read

All KEL flowmeters are available with either a 5:1 max:min flow turndown or a 2:1 turndown version. The 5:1 meters are typically used in wide range metering applications. The 2:1 units are used in process monitoring situations, or in any installation requiring reduced pressure loss (see flow vs. pressure loss table.) This specialization offers superior scale resolution to a one-size-fits-all approach. To make the flow easy to read, the KEL has a large 4-1/2" dial face with the measurement units evenly spaced on it's perimeter. This even spacing is possible since the meter movement is linear with flow. The internal mechanism that linearizes the flow also dampens out needle vibration, making it possible to truly read the flow rate, rather than guess at it.

Easy to Maintain

The orifice portion of the KEL is connected to the pressure sensing section via ducts bored into the meter casing. Since the KEL requires no pulsation snubbers because of its built-in damping, these ducts are made large enough for easy cleaning. The larger ducts make the KEL less sensitive to fouling in the first place. With costly downtime in mind, most KEL models offer an optional isolation valve that allows the pressure sensing portion of the meter to be isolated from the orifice portion while the user's process is pressurized. This eliminates the need to interrupt the user's process. An isolation mechanism makes sure that no valuable operating time need be lost to perform unscheduled sensor maintenance.

Specifications

Blind Flow Switch - V Series



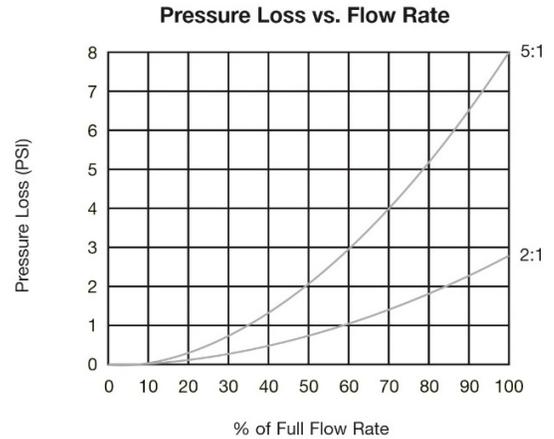
Repeatability:	2% of actual
Maximum Pressure:	230 PSIG or ANSI CI B16.5
Maximum Temperature:	
Ambient:	190 °F, 250 °F Optional
Media:	190 °F, 250 °F Optional Higher media temps available with remote control unit option - see order details
Enclosure:	IP65 (NEMA 4)
Output:	Micro-switch SPDT 15A @ 125, 250, 480 VAC 2A @ 30 VDC 0.4A @ 125 VDC 0.2A @ 230 VDC
Hysteresis:	10%

Visual Analog Flowmeter - KEL-Q, with Switch - KEL-S Series



- Accuracy:** ±5% 20...80% of full scale
±10% at 100% of full scale
- Repeatability:** 2% of actual
- Maximum Pressure:** 230 PSIG or ANSI CI B16.5
- Maximum Temperature:**
- Ambient:** 190 °F, 250 °F Optional
- Media:** 190 °F, 250 °F Optional
Higher media temps available with remote control unit option - see order details
- Enclosure:** IP43 (NEMA 3R)
IP65 (NEMA 4) Optional
- Output:** 2x Micro-switch SPDT
15A @ 125, 250, 480 VAC
2A @ 30 VDC
0.4A @ 125 VDC
0.2A @ 230 VDC
- Hysteresis:** 10%

Pressure Loss



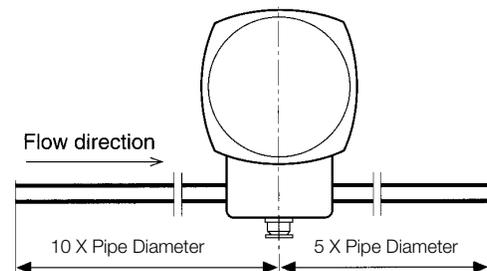
The KEL determines the rate of flow by measuring the pressure loss across a calibrated orifice. The total pressure loss through the meter is as shown above. This pressure loss data reflects the use of water as the media. Meters have either a 5:1 or a 2:1 turn-down. Please contact your KOBOLD representative for further details.

Digital Flowmeter, Transmitter, Switch with Bargraph - KEL-D Series



- Accuracy:** ±3% of full scale
- Maximum Pressure:** 230 PSIG or ANSI CI B16.5
- Maximum Temperature:**
- Ambient:** 150 °F
- Media:** 150 °F ; higher media temps available with remote control unit option - see order details
- Enclosure:** IP65 (NEMA 4)
- Power Supply:** 18 ... 30 VDC
- Local Display:** Backlit graphical, rotatable
- Totalizer:** Re-settable volume flow
- Switch Output:** 2x Relay, 50 VDC/VAC max
30W max, 1mA 5 VDC min
- Analog Output:** 4-20 mA, 500 ohm max
- Frequency Output:** 200 ... 1000 Hz
- Current Consumption:** 100mA max

Piping Requirements



To function properly, all models of the KEL require lengths of straight piping to be plumbed into the units at the inlet and outlet fittings. The inlet length must be 10 times the pipe diameter. The outlet length must be 5 times the pipe diameter.



Heavy Duty Differential Pressure Flowmeters Model KEL

Available KEL Process Fittings

Threaded: Brass	
	Available Sizes: 1/2" ... 1-1/2" NPT
	Standard Wetted Parts: Brass, SS, NBR, Nylon®
	Optional Wetted Parts: FKM, EPDM
	User Modifiable Ranges
	Optional Indicator Isolation Mechanism
Threaded: Stainless Steel	
	Available Sizes: 1/2" ... 1" NPT
	Standard Wetted Parts: SS, FKM
	Optional Wetted Parts: NBR, EPDM
	Excellent Resistance to Corrosive Chemicals
	Unitized Body and Orifice
Wafer-Style Flange: Brass/Cast Iron	
	Available Sizes: 1/2" ... 8" ANSI Flange
	Standard Wetted Parts for 1/2" ... 1-1/2" Flanges: Brass, SS, NBR, Nylon®
	Optional Wetted Parts for 1/2" ... 1-1/2" Flanges: FKM, EPDM
	Standard Wetted Parts for 2" ... 8" Flanges: Brass, Epoxy Coated Cast Iron, NBR, Nylon®
	Optional Wetted Parts for 2" ... 8" Flanges: FKM, EPDM
	Optional Indicator Isolation Mechanism
Wafer-Style Flange: Stainless Steel	
	Available Sizes: 1/2" ... 8" ANSI Flange
	Standard Wetted Parts: SS, FKM
	Optional Wetted Parts: NBR, EPDM
	Excellent Resistance to Corrosive Chemicals
	Unitized Body and Orifice
	Optional Indicator Isolation Mechanism



Order Details (Ex: **KEL-Q 2 2 N 20 N**)

Model	Turndown	Body Material	Fitting Style	Piping Size	Options
KEL-V.. = Blind Flow Switch, SPDT Micro-switch				..15 = 1/2"	..D = IP65 (for KEL-S and KEL-Q only)
KEL-Q.. = Analog Display Flowmeter Rate	..2.. = 2:1	..1.. = Brass or Brass/ Cast Iron	..N.. = NPT	..20 = 3/4"	..HT = High Temperature Switch(es) (250 °F max) (KEL-V and KEL-S series only)
KEL-S.. = Analog Display Flowmeter Rate with 2 SPDT Micro-switches	..5.. = 5:1	..2.. = Stainless Steel	..G.. = BSP	..25 = 1"	..R1 = Remote Indicator, Brass, 5.5 ft Polyamide Tubing (maximum media temperature of 250 °F)
KEL-D.. = Back-lit Digital Rate/ Total Bargraph Display with 4-20 mA Output			..A.. = ANSI	..40 = 1-1/2"	..R2 = Remote Indicator, SS, No Tubing Included (maximum media temperature of 480 °F)
			..D.. = DIN	..50 = 2"	..G = Gold Plated Contact(s)
				..80 = 3"	..F = FKM Seals (for Brass Unit Only)
				..1H = 4"	..E = EPDM Seals (for Brass or SS Units)
				..1F = 6"	..N = NBR Seals (for SS Units Only)
				..2H = 8"	

KEL 5:1 Range/Piping Size Table GPM Water

Pipe Size	Range (GPM)	Pipe Size	Range (GPM)	Pipe Size	Range (GPM)
1/2"	0.1...0.5	1-1/2"	2...10*	4"	20...100
1/2"	0.25...1.25	1-1/2"	5...25*	4"	40...200
1/2"	0.5...2.5	1-1/2"	10...50*	4"	60...300
1/2"	1...5	1-1/2"	15...75*	4"	100...500
1/2"	1.5...7.5	Wafer only		6"	50...250
1/2"	2...10	2"	2...10	6"	100...500
3/4"	1...5	2"	10...50	6"	150...750
3/4"	1.5...7.5	2"	20...100	6"	200...1000
3/4"	2...10	2"	25...125	8"	100...500
3/4"	4...20	3"	10...50	8"	150...750
1"	1.5...7.5	3"	20...100	8"	250...1250
1"	3...15	3"	40...200	8"	400...2000
1"	4...20	3"	50...250	---	---
1"	5...25	---	---	---	---
1"	6...30	---	---	---	---

KEL 2:1 Range/Piping Size Table GPM Water

Pipe Size	Range (GPM)	Pipe Size	Range (GPM)	Pipe Size	Range (GPM)	Pipe Size	Range (GPM)
1/2"	0.15...0.3	3/4"	4.0...8.0	1-1/2"	25...50*	4"	50...100
1/2"	0.2...0.4	3/4"	5.0...10	Wafer only		4"	75...150
1/2"	0.3...0.6	3/4"	6.0...12	2"	5.0...10	4"	100...200
1/2"	0.4...0.8	1"	2.0...4.0	2"	8.0...16	4"	150...300
1/2"	0.5...1.0	1"	3.0...6.0	2"	10...20	6"	150...300
1/2"	0.75...1.5	1"	4.0...8.0	2"	15...30	6"	200...400
1/2"	1.0...2.0	1"	5.0...10	2"	20...40	6"	300...600
1/2"	1.5...3.0	1"	6.0...12	2"	30...60	6"	400...800
1/2"	2.0...4.0	1"	8.0...16	2"	40...80	8"	200...400
1/2"	3.0...6.0	1"	10...20	3"	30...60	8"	300...600
1/2"	4.0...8.0	1-1/2"	5.0...10*	3"	40...80	8"	400...800
3/4"	1.0...2.0	1-1/2"	8.0...16*	3"	60...120	8"	600...1200
3/4"	1.5...3.0	1-1/2"	10...20*	3"	80...160		
3/4"	2.0...4.0	1-1/2"	15...30*	3"	90...180		
3/4"	3.0...6.0	1-1/2"	20...40*	4"	40...80		

*Ranges associated with 1-1/2" pipe size are not available in the stainless steel threaded versions

Note: The following information MUST be specified on your purchase order along with the selected item number

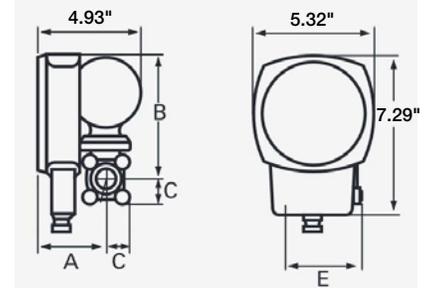
A flow range as listed in one of the above tables, the media, the operating and maximum pressure, the operating and maximum temperature, and the flow direction. Please note, if the media is other than water, you must specify the density and viscosity. A range adjustment may be necessary to accommodate the media. Alternate units of measure (i.e. GPH, LPM, M³/H) are available upon request.



KEL-Q and KEL-S Dimensions (Inches)

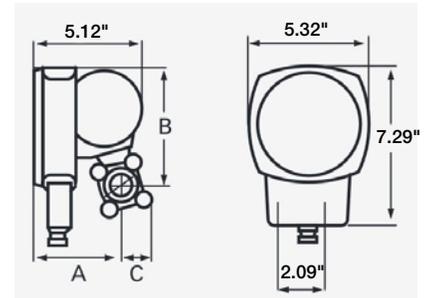
Threaded Brass Meters

Fitting (Threaded)	Dimensions				Weight (lbs)
	A	B	C	E	
1/2"	3.35	5.91	1.18	3.15	7.9
3/4"	3.35	5.91	1.18	3.15	7.9
1"	3.35	5.91	1.18	3.15	7.9
1-1/2"	3.74	6.30	1.57	3.54	9.9



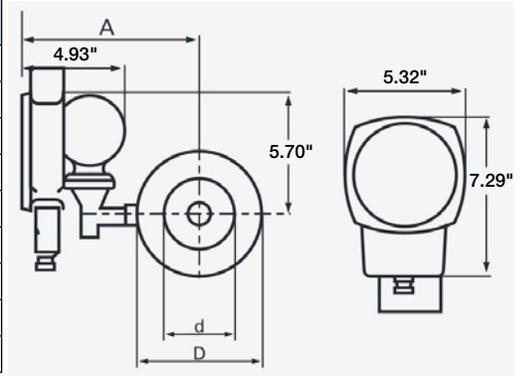
Threaded Stainless Steel Meters

Fitting (Threaded)	Dimensions			Weight (lbs)
	A	B	C	
1/2"	4.33	5.12	1.38	7.3
3/4"	4.33	5.12	1.38	7.3
1"	4.33	5.12	1.38	7.3



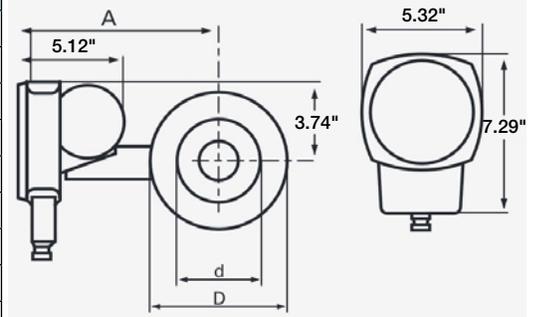
Brass/Cast Iron Wafer Style Meters

Fitting (Wafer)		Dimensions for use with schedule 40 piping						Weight (lbs)
(ANSI)	(DIN)	d (DIN)	d (ANSI)	D (DIN)	D (ANSI)	A (DIN)	A (ANSI)	
1/2"	15	0.63	0.63	2.09	1.77	6.30	6.02	9.2
3/4"	20	0.87	0.87	2.48	2.17	6.46	6.26	10.3
1"	25	1.18	1.02	2.87	2.52	6.73	6.50	10.8
1-1/2"	40	1.69	1.61	3.70	3.27	7.17	6.93	13.0
2"	50	2.17	2.09	4.29	4.02	7.48	7.32	13.9
3"	80	3.23	3.07	5.67	5.28	8.15	7.95	17.3
4"	100	4.21	4.02	6.46	6.77	8.54	8.70	19.8
6"	150	6.26	6.26	8.62	8.62	9.65	9.65	24.9
8"	200	8.15	8.15	10.79	10.79	10.75	10.75	33.5



Stainless Steel Wafer Style Meters

Fitting (Wafer)		Dimensions for use with schedule 40 piping						Weight (lbs)
(ANSI)	(DIN)	d (DIN)	d (ANSI)	D (DIN)	D (ANSI)	A (DIN)	A (ANSI)	
1/2"	15	0.63	0.63	2.09	1.77	7.04	6.97	6.8
3/4"	20	0.87	0.83	2.48	2.17	7.28	7.09	7.0
1"	25	1.18	1.06	2.87	2.52	7.60	7.24	7.3
1-1/2"	40	1.69	1.61	3.70	3.27	8.07	7.64	7.7
2"	50	2.17	2.09	4.29	4.02	8.66	8.07	8.1
3"	80	3.23	3.07	5.67	5.24	9.37	8.74	9.2
4"	100	4.21	4.02	6.46	6.73	9.76	9.53	9.9
6"	150	6.26	6.06	8.62	8.62	10.87	10.87	12.3
8"	200	8.15	7.99	10.79	10.87	11.93	11.97	15.4

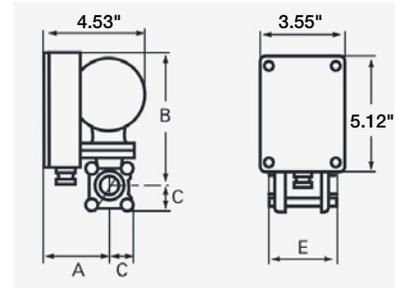




KEL-V and KEL-D Dimensions (Inches)

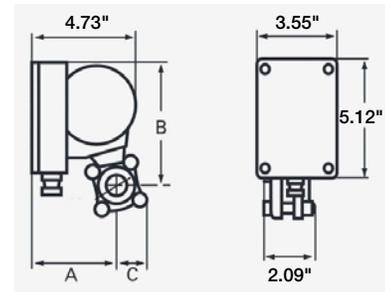
Threaded Brass Meters

Fitting (Threaded)	Dimensions				Weight (lbs)
	A	B	C	E	
1/2"	2.95	5.90	1.18	3.15	6.7
3/4"	2.95	5.90	1.18	3.15	6.7
1"	2.95	5.90	1.18	3.15	6.7
1-1/2"	2.16	6.30	1.57	3.54	8.8



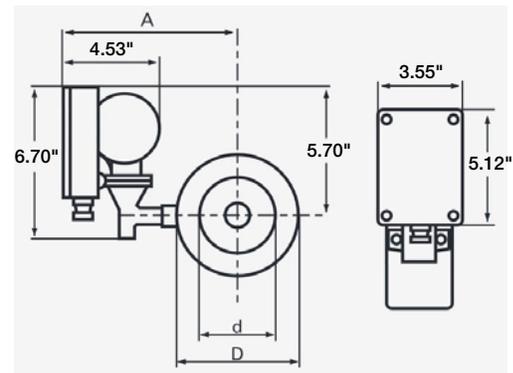
Threaded Stainless Steel Meters

Fitting (Threaded)	Dimensions			Weight (lbs)
	A	B	C	
1/2"	3.97	5.12	1.38	6.7
3/4"	3.97	5.12	1.38	6.7
1"	3.97	5.12	1.38	6.7



Brass/Cast Iron Wafer Style Meters

Fitting (Wafer)		Dimensions for use in schedule 40 piping						Weight (lbs)
(ANSI)	(DIN)	d (DIN)	d (ANSI)	D (DIN)	D (ANSI)	A (DIN)	A (ANSI)	
1/2"	15	0.63	0.63	2.08	1.77	5.90	6.02	8.8
3/4"	20	0.87	0.87	2.48	2.17	6.06	6.26	9.9
1"	25	1.18	1.02	2.87	2.52	6.33	6.50	9.9
1-1/2"	40	1.69	1.61	3.70	3.27	6.77	6.93	13.2
2"	50	2.17	2.09	4.29	4.02	7.08	7.32	13.2
3"	80	3.23	3.07	5.67	5.28	7.75	7.95	17.6
4"	100	4.21	4.02	6.46	6.77	8.15	8.70	17.6
6"	150	6.26	6.26	8.62	8.62	9.25	9.25	24.3
8"	200	8.15	8.15	10.79	10.79	10.35	10.35	33.1



Stainless Steel Wafer Style Meters

Fitting (Wafer)		Dimensions for use in schedule 40 piping						Weight (lbs)
(ANSI)	(DIN)	d (DIN)	d (ANSI)	D (DIN)	D (ANSI)	A (DIN)	A (ANSI)	
1/2"	15	0.63	0.63	2.08	1.77	6.42	6.46	6.7
3/4"	20	0.87	0.83	2.48	2.17	6.69	6.57	6.7
1"	25	1.18	1.06	2.87	2.52	6.93	6.73	6.7
1-1/2"	40	1.69	1.61	3.70	3.27	7.40	7.13	6.7
2"	50	2.17	2.09	4.29	4.02	7.72	7.56	6.7
3"	80	3.23	3.07	5.67	5.24	8.46	8.23	7.7
4"	100	4.21	4.02	6.46	6.73	8.86	9.02	8.8
6"	150	6.26	6.06	8.62	8.62	10.31	10.35	11.0
8"	200	8.15	7.99	10.79	10.87	11.42	11.46	14.3

