LIQUID FLOW METER

DESIGNED TO WITHSTAND THE MOST RIGOUROUS
FLOW MEASUREMENT APPLICATIONS

KIMRAY INC.®

TURBINE FLOW METER

INDEX

04 MODEL 1100

06 QUIKSERT®

08 MODEL BK2800

10 MODEL BK3000

LIQUID FLOW METER

TURBINE FLOW METER

MODEL 1100

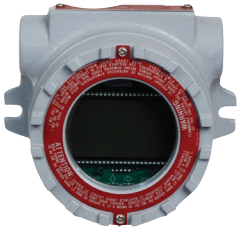
TURBINE FLOW METER

QUIKSERT®

TURBINE FLOW METER

MODEL BK2800

MONITOR



EXPLOSION-PROOF ENCLOSURE

MODEL BK3000

MONITOR

EXPLOSION-PROOF ENCLOSURE

TURBINE FLOW METER

MODEL 1100

Rugged 316 stainless steel construction offers long service life in severe operating environments

Available in NPT, BSP, Victaulic®, Flange, or Hose Barbed end connections

Offers accurate and repeatable flow measurement in ranges from 0.6 to 5000 GPM (20 - 171,000 BPD)

Field replaceable repair kits allow for turbine replacement without loss of accuracy

Both the Flow Meter and the repair kits are factory calibrated.

INTRODUCTION

The Model 1100 Turbine Flow Meter is designed to withstand the demands of the most rigorous flow measurement applications. Originally developed for the secondary oil recovery market, the Model 1100 is an ideal meter for liquid flow measurement on or off the oilfield.

The meter features a rugged 316 stainless steel housing and rotor support assemblies, CD4MCU stainless steel rotor, and abrasive-resistant tungsten carbide rotor shaft and journal bearings. The Model 1100 maintains measurement accuracy and mechanical integrity in the corrosive and abrasive fluids commonly found in oilfield water flood projects and many industrial applications.

Designed to operate with the Model B2800 Flow Monitor, the Model 1100 turbine meter meets a wide range of measurement requirements. This makes it ideal for applications such as pipelines, production/injection fields, in-situ mining operations, offshore facilities and other industrial applications.

OPERATING PRINCIPLE

Fluid entering the meter passes through the inlet flow straightener which reduces its turbulent flow pattern and improves the fluid's velocity profile. Fluid then passes through the turbine, causing it to rotate at a speed proportional to fluid velocity. As each turbine blade passes through the magnetic field at the base of the transducer, an AC voltage pulse is generated in the pickup coil. These pulses produce an output frequency proportional to the volumetric flow through the meter.

ACCUKIM®

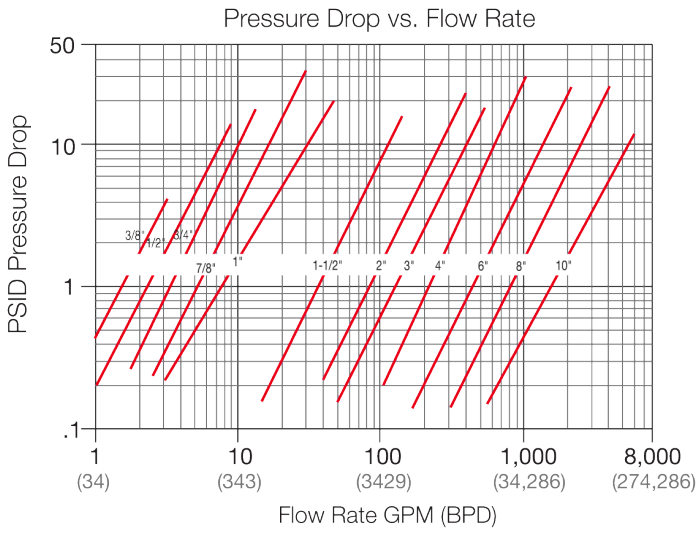
While the standard Kimray turbine meter is highly accurate and precise, sometimes you need more. Kimray offers AccuKim® flow meters for those situations. AccuKim has an accuracy rating of ±0.5% of reading. AccuKim is available in all the same sizes available with the standard Kimray Turbine Meters. Simply add "HA" to the end of the order code when ordering. (i.e. KSB110-375HA)

For more information please visit Kimray.com

MODEL 1100

SPECIFICATIONS

Body	316 Stainless Steel
Rotor	CD4MCU Stainless Steel
Rotor Support	316 Stainless Steel
Rotor Shaft	Tungsten Carbide
Turndown Ratio	10:1
Flow Accuracy - Standard	±1% of reading
Flow Accuracy - AccuKim	±0.5% of reading
Repeatability	± 0.1%
Calibration	Water (NIST traceable calibration)
Pressure Rating	5,000 psi (maximum)
Turbine Temperature	-150 °F to +350 °F (-101 °C to 177 °C)
End Connections	NPT, Victaulic®, Flange, Hose Barbed



Order Code	Meter Size	End Connection	End to End Length	Flow Ranges GPM	Flow Ranges BPD	Approx. K-Factor pulses/gal.	Repair Kit Part Number
KSB110-375	3/8"	1" x 1" Male NPT	4"	.6-3	20-100	18,000	KSB251-102
KSB110-375-1/2	3/8"	1/2" x 1/2" Male NPT	3"	.6-3	20-100	18,000	KSB251-102
KSB110-500	1/2"	1" x 1" Male NPT	4"	.75-7.5	25-250	13,000	KSB251-105
KSB110-500-1/2	1/2"	1/2" x 1/2" Male NPT	3"	.75-7.5	25-250	13,000	KSB251-105
KSB110-750	3/4"	1" x 1" Male NPT	4"	2-15	68-515	3,300	KSB251-108
KSB110-750-1/2	3/4"	1/2" x 1/2" Male NPT	3"	2-15	68-515	3,300	KSB251-108
KSB110-875	7/8"	1" x 1" Male NPT	4"	3-30	100-1000	3,100	KSB251-109
KSB111-110	1"	1" x 1" Male NPT	4"	5-50	170-1700	870	KSB251-112
KSB111-115	1-1/2"	1-1/2" x 1-1/2" Male NPT	6"	15-180	515-6000	330	KSB251-116
KSB111-120	2"	2" x 2" Male NPT	10"	40-400	1300-13000	52	KSB251-120
KSB111-121	1-1/2"	2" x 2" Male NPT	6"	15-180	515-6000	330	KSB251-116
KSB311-066	1-1/2"	Grooved End	6"	15-180	515-6000	330	KSB251-116
KSB111-130	3"	Grooved End	12-1/2"	60-600	2100-21000	57	KSB251-131
KSB111-140	4"	Grooved End	12"	100-1200	3400-41000	29	KSB251-141

Sizes up to 10 inch available in NPT, Victaulic®, Flange, Hose Barbed. Contact Kimray for order code and prices

QuikSert®

- Modified flow straighteners for enhanced fluid dynamics
- Unique “between-the-flange” design eliminates need for mating flanges
- Superior materials of construction for high performance in aggressive environments
- Accurate (± 1% of reading standard, ± 0.5% optional)and reliable (repeatability ± 0.1%) flow measurement solution
- Wafer-style mounting configuration allowing for limited space requirements
- Both the Flow Meter and the repair kits are factory calibrated.

INTRODUCTION

The QuikSert in-line turbine flow meter was developed for applications where accuracy and dependability are of concern to the operator. QuikSert’s stainless steel body incorporates a helical turbine with tungsten carbide shaft and bearings. It provides an efficient, long service life and a cost-effective solution for your measurement requirements.

Simple in design and construction, QuikSert utilizes modified upstream and downstream flow straighteners for a high degree of flow accuracy. Its between-the-flange design eliminates the need for mating flanges, requiring less space in the flow line, lowering costs and providing easy, one-man installation.

The meter produces a sine-wave signal proportional to its volumetric flow rate. With optional Kimray electronics, QuikSert provides local flow rate and volume totalization and will interface with most instruments, PLCs and computers.

OPERATING PRINCIPLE

Fluid entering the meter first passes through an inlet flow straightener that reduces its turbulent flow pattern. Fluid then passes through the turbine, causing the turbine to rotate at a speed proportional to fluid velocity. As each turbine blade passes through the magnetic field generated by the meter’s magnetic pick-up, an AC voltage pulse is generated. These pulses provide an output frequency that is proportional to volumetric flow.

ACCUKIM®

While the standard Kimray turbine meter is highly accurate and precise, sometimes you need more. Kimray offers AccuKim flow meters for those situations. AccuKim has an accuracy rating of ±0.5% of reading. AccuKim is available in all the same sizes available with the standard Kimray Turbine Meters. Simply add “HA” to the end of the order code when ordering. (i.e. KSB131-038HA)

SPECIFICATIONS

QuikSert®

Body and internal wetted parts	316L Stainless Steel
Bearings	Tungsten Carbide
Turbine	CD4MCU Stainless Steel
Shaft	Tungsten Carbide
Turndown Ratio	10:1
Flow Accuracy - Standard	±1% of reading
Flow Accuracy - AccuKim	±0.5% of reading
Repeatability	± 0.1%
Calibration	Water (NIST traceable calibration)
Turbine Temperature	-150 °F to +350 °F (-101 °C to 177 °C) Temperatures to +450 °F (+232 °C) with high-temp pickup, consult Kimray for details
End Connections	Wafer-style ASME/ANSI B16.5-1996

Order Code	Bore Size x Line Size	Maximum Pressure Drop (psi)	Dimensions Diameter x Length (in)	Flow Ranges GPM	Flow Ranges BPD	Approx. K-Factor pulses/gal.	Repair Kits
KSB131-038	3/8" x 1"	3.75	2 x 4	.6-3	20-100	18,000	KSB253-102
KSB131-050	1/2" x 1"	6.5	2 x 4	.75-7.5	25-250	13,000	KSB253-105
KSB131-075	3/4" x 1"	18	2 x 4	2-15	68-515	3,300	KSB253-108
KSB131-088	7/8" x 1"	20	2 x 4	3-30	100-1000	3,100	KSB253-109
KSB131-100	1" x 1"	20	2 x 4	5-50	170-1700	870	KSB253-112
KSB132-050	1/2" x 2"	12	3.62 x 2.5	.75-7.5	25-250	13,000	KSB253-205
KSB132-075	3/4" x 2"	18	3.62 x 2.5	2-15	68-515	3,300	KSB253-208
KSB132-088	7/8" x 2"	20	3.62 x 2.5	3-30	100-1000	3,100	KSB253-209
KSB132-100	1" x 2"	20	3.62 x 2.5	5-50	170-1700	870	KSB253-212
KSB132-150	1-1/2" x 2"	16	3.62 x 2.5	15-180	515-6000	330	KSB253-216
KSB132-200	2" x 2"	9	3.62 x 2.5	40-400	1300-13000	52	KSB253-220
KSB133-300	3" x 3"	10	5 x 4.25	60-600	2100-21000	57	KSB253-330
KSB134-400	4" x 4"	10	6.18 x 5	100-1200	3400-41000	29	KSB253-440
KSB136-600	6" x 6"	10	8.5 x 5.75	200-2500	6800-86000	7	KSB253-660
KSB138-800	8" x 8"	10	10.62 x 6.25	350-3500	1200-120000	3	KSB253-880

MODEL BK2800

User friendly front panel programing NEMA 4X enclosure suitable for outdoor monitoring (meter, remote and swivel mount versions)

Large 8 digit 3/4" display for easy viewing

Battery (1.5 VDC) and Loop-powered (4-20 mA) versions available

Six mounting options: meter, remote, swivel, hand-held, panel or explosion-proof

INTRODUCTION

The BK2800 is an advanced microprocessor-based flow monitor that is also low cost and simple to operate. When ordered with a Kimray turbine meter, the BK2800 is configured at the factory for units of rate and total. Or, the unit may be easily programmed in the field. The monitor has a large two-line display and is available in power and mounting options to suit almost any application.

OPERATING PRINCIPLE

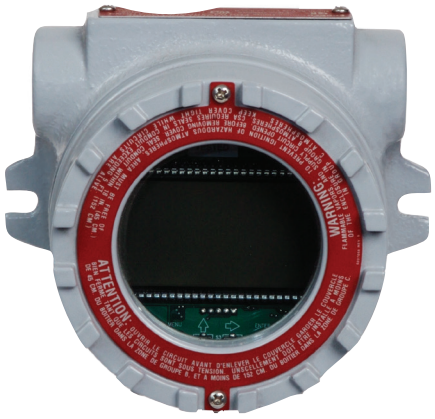
The BK2800 flow monitor accepts a low-level frequency input, such as the input from a Kimray turbine meter, to calculate flow rate and total. These calculations are then displayed in user selected units of measurement. All BK2800 flow monitors come pre-calibrated from the factory if ordered with a Kimray flow meter. However, they can be easily reconfigured in the field. The BK2800 is available in a battery-powered or loop-powered version. The battery version utilizes one "D" size, 1.5 volt alkaline battery that provides up to 3-1/2 years of service.

The loop-powered BK2800 offers a 2-wire 4-20 mA output for electronic integration. The meter mount, remote, swivel and hand-held monitors are equipped with a large 8 digit 3/4" numerical LCD making extended range viewing practical. The second 8 character 3/8" alphanumeric display provides for selectable units viewing in run mode and prompts variables in programming mode. Additionally, the user can choose between displaying rate, total or alternating between both rate and total.

For more information please visit Kimray.com

SPECIFICATIONS

LCD Display	Rate & total, fixed or toggle modes of operation 8 digit, 0.7 inches (18 mm) numeric (top line) 8 character, 0.35 inches (9 mm) alphanumeric (bottom line); resettable
Battery Power	1 "D" size 1.5 VDC alkaline battery included. Less than 1 milliwatt (~3.5 years on 1 "D" battery)
Loop-Powered	4-20 mA, two-wire current loop. 25 mA maximum consumption
Units of Measure: (Rate/total) (Simplified Version - user selectable)	GPM/gallons, LPM/liters, M3PD/cubic meters, BPD/barrels, M3PH/cubic meters
Units of Measure: (Total) (Advanced Version - user selectable)	Gallons, Oil Barrels, Liters, Cubic Meters, MGal, Cubic Ft, MLiters, MCF, MMCF, Acre Ft, Liquid Barrels, Lbs, Kgs
CERTIFICATIONS CSA Intrinsically Safe	Class I, Division 1, Groups C & D Class II, Division 1, Groups E, F & G
CE	IEC 61326-1
CSA: (Panel Mount Only)	Ordinary Area
CSA Hazardous Locations	Class I, Division 1, Groups B, C & D
(Explosion-Proof Model Only)	(Explosion-Proof Model Only) Class II, Groups E, F & G Class III, Type 4, T6 @ 70 C



EXPLOSION-PROOF ENCLOSURE

Model B311 Meter & Flow Monitor Packages (Measured in Barrels)

Order Code	Mounting Style	Meter Size	End Connection
KSB311-067	Meter Mount	1"	1" x 1" Male NPT
KSB311-068	Meter Mount	1-1/2"	1-1/2" x 1-1/2" Male NPT
KSB311-069	Meter Mount	2"	2" x 2" Male NPT
KSB311-071	Swivel Mount	1"	1" x 1" Male NPT
KSB311-072	Swivel Mount	2"	2" x 2" Female NPT
KSB311-076	Swivel Mount	1-1/2"	1-1/2" x 1-1/2" Male NPT
KSB311-083	Swivel Mount	1"	1" x 1" Male NPT
KSB311-084	Remote Mnt w/Cable & Brkt	1"	1" x 1" Male NPT
KSB311-085	Meter Mount	1"	1" x 1" Male NPT
KSB311-086	Remote Mnt w/Cable & Brkt	2"	2" x 2" Male NPT
KSB311-088	Swivel Mount	1-1/2"	2" x 2" Male NPT

MODEL BK3000

Flexible power options include solar, battery, and 4-20mA loop power

Robust alarm parameters provide faster warning when something changes in the process or pipeline

Updated display provides more information at your fingertips.

Multiple enclosure options ensure there's a KSB3000 model for your operation

Advance connectivity options allow you to connect meters to your network for remote monitoring and process automation capabilities

INTRODUCTION

The BK3000 Series flow meter from Kimray provides you with a flexible, durable, easy-to-use platform for your flow metering applications. The BK3000 Series makes it easy to monitor flow, with a crisp dot-matrix display capable of simultaneous display of flow rate and flow total. With a wide variety of enclosure options for both liquid and gas applications, from intrinsically safe and explosion-proof (flameproof) ratings, to an innovative solar-powered model, there's a BK3000 to suit your needs. And, intrinsically safe models are housed in a UV-resistant, NEMA 4X-rated, enclosure available in direct, panel, pipe, DIN-rail or swivel mounts.

OPERATING PRINCIPLE

The BK3000 Series was designed with smart management of unit power in mind. All units feature extremely low power consumption in normal operating conditions and are both 4-20mA loop and battery-powered*. You'll never have to worry about losing power, and the onboard battery will last up to 8 years.

The BK3000 Series also provides you with powerful operating features. Multi-point linearization tables are supported in all models, providing increased reading accuracy. Accessing the powerful advanced programming mode is as easy as pressing a single button. The standard communications interface is 4-20mA and total pulse, while the advanced interface adds two control alarms and Modbus RTU over RS485.

Kimray's trusted flow metering technology is now available with more options and features than ever before with the BK3000 Series.

*Solar version available as battery-powered monitor only

SPECIFICATIONS

Display	Dot matrix LCD, STN Fluid ,Simultaneous display of Rate and Total
Power	Auto switching between internal battery and external loop power; BK30A and BK30Z includes isolation between loop power and other I/O
Battery	3.6 V lithium "D Cell", up to 8-year service life
Loop	4-20mA, two-wire, 25mA limit, reverse polarity protected, 7 VDC loop loss
Power (solar model only)	Internal 3.6 V NiCd battery provides up to 30 days of power after 6-8 hours exposure of the integrated photovoltaic cell to direct sunlight
Flow Sensor Input	User selection of magnetic pickup or amplified sensor signal
Range	1 to 3,500 Hz
Magnetic	Direct connection to magnetic flow sensor pickup (variable reluctance); 30mVp-p or 60mVp-p trigger sensitivity, user selectable; 30 V over voltage protection
Amplified	Direct connection to amplified signal (pre-amp output from sensor)
Pulse Output	One pulse for each increment of the least significant digit of the totalizer **Pulse Type:** Opto-isolated open collector transistor and non-isolated open drain FET, user selectable **BK30S Pulse Type:** Non-isolated open drain FET 30 VDC maximum, 0.14 maximum, 30mS pulse width, 16 Hz maximum
Status Alarms (B30A and B30Z only)	Two adjustable flow rate alarms with programmable dead band and phase. Open drain FET, 30 VDC Max, 0.14 Max
Digital Communications (B30A and B30Z only)	Modbus RTU over RS485, 127 addressable units / 2-wire network, 9600 baud, long integer and single precision IEEE754 formats; retrieve: flow rate, job totalizer, grand totalizer, alarm status and battery level; write: reset job totalizer, reset grand totalizer
Measurement Accuracy	0.05%
Response (Damping)	1 -100 seconds response to a step change input, user adjustable
Environment	-22 to +158F (-30 to +70C); 0-90% humidity, non-condensing

Construction	**BK30A/B/S:** Polycarbonate, stainless steel, polyurethane, thermoplastic elastomer, acrylic; Type 4X/IP66 **BK30X/Z:** Copper free, epoxy-coated aluminum, buna seal, Type 4X/IP66
CERTIFICATIONS	
Safety	**BK30A/B/S**: Class I, Division 1, Groups C, D; Class II, Division 1 Groups E, F, G; Class III for US and Canada. Complies with UL 913 and CSA C22.2 No. 153 ATEX II 2 GD Ex ib IIB T4. Complies with safety standards: EN 60079-0, EN 60079-11, EN 61241-0, and EN61241-11* **BK30X/Z:** Class I, Division 1, Groups B, C, D; Class II, Division 1 Groups E, F, G; Class III for US and Canada. Complies with UL .1203 and CSA C22.2 No. 30 ATEX II 2 G Ex d IIC T4 Gb and ATEX II 2 D Ex tb IIIC T120 C Db. Complies with safety standards: EN 60079-0, EN 60079-1, and EN60079-36*
Entity Parameters	**BK30A/B only:** 4-20mA Loop: Vmax=28 VDC, Imax=26mA, Ci=0.5uF, Li=0mH **BK30A/B/S only:** Pulse Output: Vmax=28 VDC, Imax=100m4, Ci=0uF, Li=0mH **BK30A/B/S only:** Reset Input: Vmax=5 VDC, Imax=5mA, Ci=0uF, Li=0mH **BK30A/B only:** RS485: Vmax=10 VDC, Imax=60mA, Ci=0uF, Li=0mH **BK30A/B/S only:** Turbine Input: Voc=2.5 V Isc=1.8mA, Ca=1.5uF, La=1.65H
CE	Emissions / Susceptibility; Complies with EN 61000-6-4 for a Class B product and EN 61000-6-2 for an ISM product *Approvals Pending
Liquid	Gallons, Liters, Oil Barrels (42 gallon), Liquid Barrels (31.5 gallon), Cubic Meters, Million Gallons, Cubic Feet, Million Liters, Acre Feet
Gas	Cubic Feet, Thousand Cubic Feet, Million Cubic Feet, Standard Cubic Feet, Actual Cubic Feet, Normal Cubic Meters, Actual Cubic Meters, Liters
Rate Time	Seconds, minutes, hours, days
Total Exponents	0.00, 0.0, x1 , x10, x100, x1,000
K-Factor Entry	Pulses/Gallon, Pulse/cubic meter, pulses/liter, pulses/cubic foot

EXPLOSION-PROOF ENCLOSURE

WHO WE ARE

Kimray designs and manufactures oil and gas control products. Based on over 65 years of pioneering product development, we provide products and services that work better, smarter and are more inventive. We generate meaningful solutions by staying curious and engaging in customers' needs. Our product ideas are fueled by a deep desire to make a difference that is both personal and unique to the customer.

We have made it our life's work to provide products and services that are positively impactful. Through the years this pursuit has built strong relationships. Our customers have known that when buying from Kimray, it's about much more than the product. The relationships between Kimray representatives and our customers extend from before the sale through the life of the product. Those relationships, along with quality Kimray products are the result of a company striving for excellence for our customers, our company and our community.

Visit Kimray.com to learn more about our company and the products we create.

KIMRAY INC.®

Kimray.com