

# Brooks® Oval Flowmeters, BM Oval Series BM01 and BM02

## FEATURES

- Low flow measurement, 0.53 to 132 GPH (2 to 500 LPH)
- Very low pressure drop
- Viscosity to 1000 Cp (Centipoise)
- High Accuracy, 1% rate or better
- 0.03% repeatability
- Only two moving parts
- Reed or solid state Hall Effect Switch
- ¼ inch female NPT standard
- Available in PPS or 316 Stainless Steel (Hastelloy® C shaft option)

## DESCRIPTION

The Brooks BM01 and BM02 are low flow positive displacement oval flowmeters designed for applications requiring the high accuracy measurement of clean liquids with viscosities less than 1000 Cp. Units are available with a pulse output from a Reed switch or solid state Hall effect switch for remote registration and/or totalization.

## PRINCIPLE OF OPERATION

The oval meter is a positive displacement meter. As the fluid being measured passes through the meter, it rotates 2 oval gears in a measuring chamber to displace a precision volume of fluid. A sensor detects the gear rotation to determine displaced volume and flow rate.

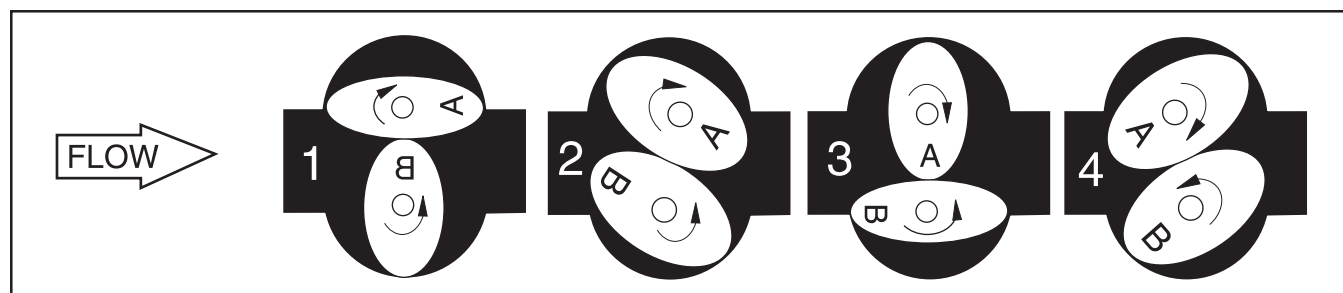
Fluid pressure rotates the oval gears, Figure 1. In position 1, the fluid exerts a clockwise driving force on Gear A.



*Typical BM01 and BM02*

There is no net driving force on Gear B. It is perpendicular to the flow so the fluid forces are balanced around the shaft. As the gears rotate to position 2, the fluid begins to exert a force on Gear B. At position 3, all the driving force is on Gear B. This alternating driving force provides a smooth rotation of almost constant torque.

The meter design minimizes the slippage between the gears and the measuring chamber wall. As a result, the oval meter is less affected than other designs by the liquid's viscosity and lubricity.



*Figure 1 Principle of Operation Chart*

## Brooks® Models BM01 and BM02

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### SPECIFICATIONS

#### Capacities

Viscosity	BM01	BM02
< 5cP	1.32 to 26 gph (5 to 100 lph)	6 to 132 gph (25 to 500 lph)
5 to 1,000cP	0.53 to 26 gph (2 to 100 lph)	4 to 132 gph (15 to 500 lph)

#### Performance

Accuracy: +/- 1%

Repeatability: 0.03%

Typical meter performance and pressure drop:  
Refer to Figure 2.

#### Ratings

Maximum working pressure:

PPS body: 75 PSIG (500 KPAG)

316 SS body: 150 PSIG (1000 KPAG)

Consult factory for higher pressure options.

Maximum working temperature:

PPS body and/or Rotors (Gears): 176° F (80° C).

316 SS body and Rotors (Gears): 248° F (120° C).

Ambient Temperature: -4° F to 104° F (-20° C to +40° C).

#### Outputs

Note: each meter contains both switch types

##### Reed Switch

Detection Method: Reed Switch, Two wire SPST N/O contact.

Max. Voltage: 150 VDC maximum.

Contact Capacity: 0.25 AMPS

Rating 3 Watts.

Termination: 39 inch (1 meter) flying lead.

Nominal K-Factor:

Model BM01: 1000 p/l (3785.4p/gal)

Model BM02: 400 p/l (1514.2 p/gal)

#### Pressure Equipment Directive (97/23/EC)

Equipment falls under Sound Engineering Practice (SEP) according to the directive.

#### Hall Effect Switch

Detection Method: Hall effect switch

Response Frequency: 1,000 Hz maximum

Output Pulse: Unfactored voltage pulse

Input/Output = 4.5 to 24 VDC (4.6 ~ 9 mA)

Open Collector 25 mA output NPN compatible with digital logic. Reverse power protection.

Termination: 39 inch (1 meter) flying lead

Nominal K-Factor:

Model BM01: 1000 p/l (3785.4p/gal)

Model BM02: 400 p/l (1514.2 p/gal)

#### Meter Materials of Construction

Meter Body: PPS (Polyphenylene Sulfide) or 316 Stainless Steel.

Rotors (Gears):

BM01 / BM02 - PPS or 316 Stainless Steel.

316 Stainless Steel only for High Viscosity.

Rotors (Gears) Bearings:

BM01 / BM02 - Zirconia

Note: (PPS Rotors No Bearings Required)

Rotors (Gears) Shafts: 316 Stainless Steel or Optional Hastalloy® C (PPS body only).

O-Rings: Standard Viton® fluoroelastomers or Optional Teflon®.

#### Connections

¼ inch NPT (female)

#### Dimensions

Refer to Figure 3. For certified dimensional prints, contact the factory.

### ORDERING INFORMATION

To order please specify:

1. Model Number
2. Product (Process Fluid)
3. Viscosity
4. Maximum Operating Temperature
5. Maximum Operating Pressure
6. Operating Flow Ranges (Min., Max., & Normal)
7. Accessories Required

# Data Sheet

DS-PD-BM01-02-eng

March, 2008

## Brooks® Models BM01 and BM02

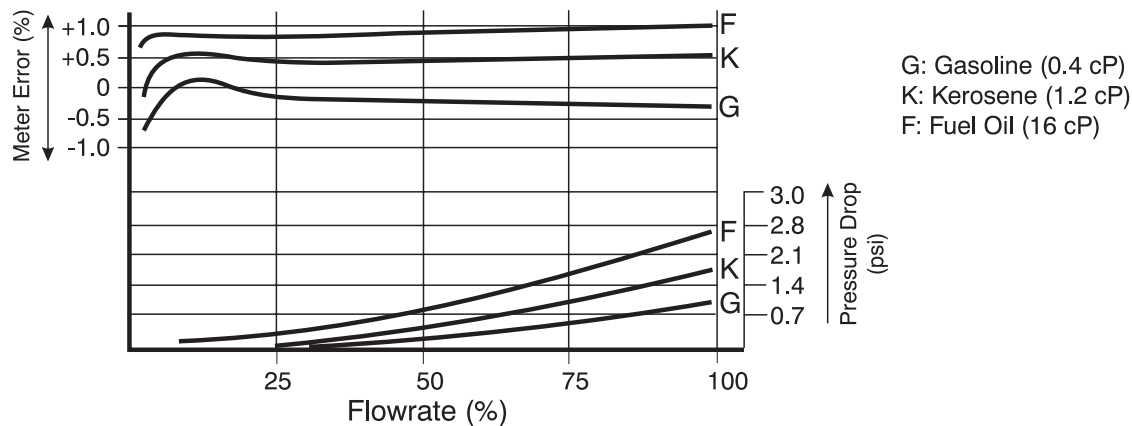


Figure 2 Typical Meter Error and Pressure Drop

Table 1 Brooks Model Code BM01 and BM02 Meters

MODEL	BASIC MODEL SIZE/RANGE	
<b>BM01B</b>	0.53 - 26 GPH / 2 - 100 LPH	
<b>BM02B</b>	4 - 132 GPH / 15 - 500 LPH	
	<b>CODE BODY/ROTOR MATERIAL</b>	
	<b>R</b>	<b>R</b> PPS (POLYPHENYLENE SULFIDE) BODY & ROTOR (GEAR)
	<b>R</b>	<b>S</b> PPS BODY & 316 STAINLESS STEEL ROTOR (GEAR)
	<b>S</b>	<b>S</b> 316 STAINLESS STEEL BODY & ROTOR (GEAR)
	<b>R</b>	<b>H</b> PPS BODY & 316 SS HIGH VISC. ROTOR (>1000cP) BM02 ONLY
	<b>S</b>	<b>H</b> 316 SS BODY & HIGH VISC. ROTOR (>1000cP) BM02 ONLY
	<b>CODE PULSER/DISPLAY</b>	
	<b>P</b>	PULSE (BM01 = 3785 PPG BM02 = 1514 PPG)
	<b>CODE CONSTRUCTION</b>	
	<b>A</b>	STANDARD CONSTRUCTION
	<b>CODE PROCESS CONNECTION</b>	
	<b>2</b>	1/4" NPT FEMALE
	<b>CODE OUTPUT</b>	
	<b>B</b>	REED / HALL SWITCH (STANDARD)
	<b>CODE O-RINGS/SEALS</b>	
	<b>V</b>	VITON (STANDARD)
	<b>K</b>	TEFLON
	<b>CODE OPTIONS</b>	
	<b>A</b>	NONE
	<b>C</b>	HAST C SHAFTS (REQUIRED WITH PPS BODY/ROTOR)

**BM01B**

**R**

**S**

**1**

**A**

**2**

**B**

**V**

**A**

## Brooks® Models BM01 and BM02

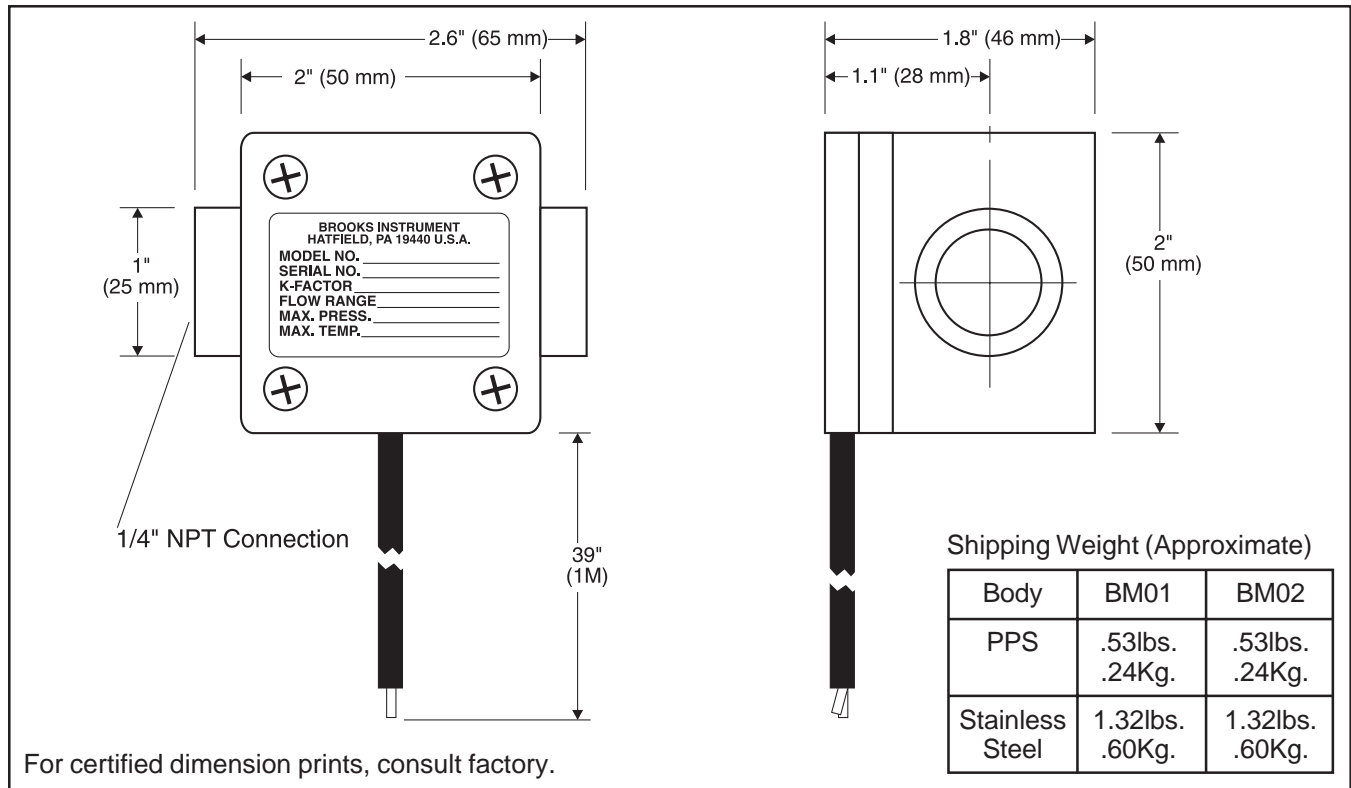


Figure 3 Dimensions

### HELP DESK

In case you need technical assistance:

Americas ☎ 1-888-554-FLOW  
Europe ☎ +(31) 318 549 290 Within Netherlands ☎ 0318 549 290  
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Due to Brooks Instrument's commitment to continuous improvement of our products, all specifications are subject to change without notice.

### TRADEMARKS

Brooks ..... Brooks Instrument, LLC  
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