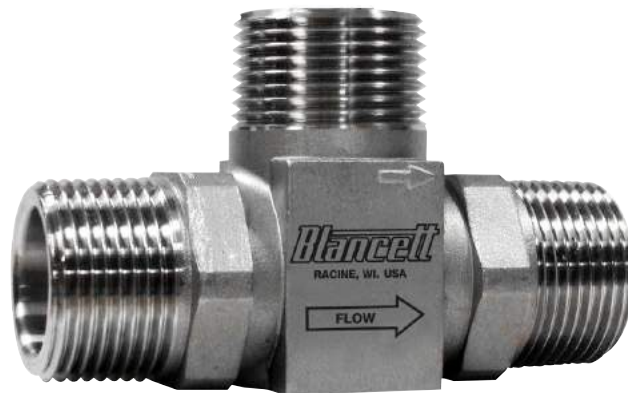




# Turbine Flow Meter

## 1100 Series Turbine Meter



TUR-UM-00014-EN-05 (April 2019)

# User Manual

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## INTRODUCTION

Designed to withstand the demands of the most rigorous flow measurement applications, the Model 1100 turbine flow meter is reliable, rugged and cost effective. Originally developed for the secondary oil recovery market, the Model 1100 is an ideal meter for liquid flow measurement on or off the oil field.

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 oil field water flood projects and other industrial applications.

## OPERATING PRINCIPLE

Fluid entering the meter passes through the inlet flow straightener that 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 the fluid velocity. As each turbine blade passes through the magnetic field, the blade generates an AC voltage pulse in the pickup coil at the base of the magnetic pickup (see *Figure 1*). These pulses produce an output frequency proportional to the volumetric flow through the meter. The output frequency represents flow rate and/or totalization of fluid passing through the turbine flow meter.

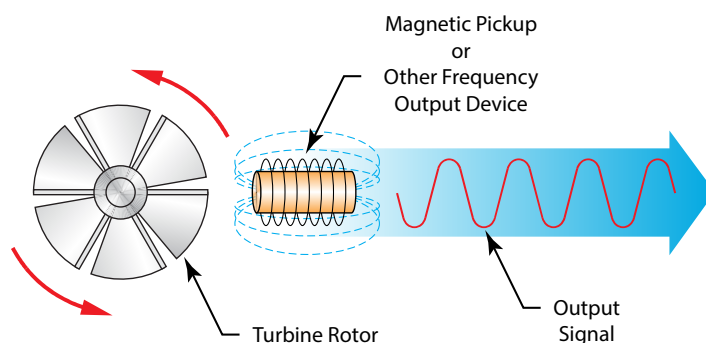
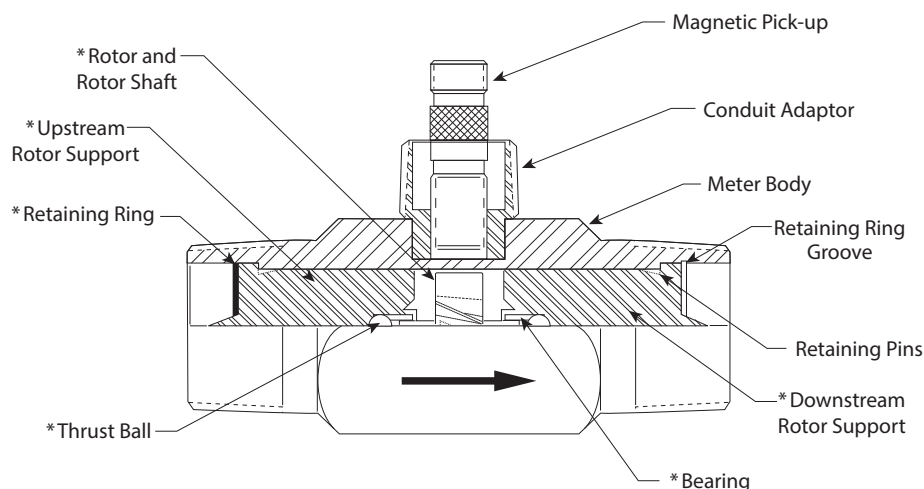


Figure 1: Schematic illustration of electric signal generated by rotor movement



**NOTE:** \* Indicates parts supplied in repair kits.

Figure 2: Typical cross-section of B110-375...B111-121 turbine flow meter

## SPECIFICATIONS

<b>Materials of Construction</b>	<b>Body</b>	316 stainless steel
	<b>Rotor</b>	CD4MCU stainless steel
	<b>Rotor Shaft</b>	Tungsten carbide
	<b>Rotor Support</b>	316 stainless steel
<b>Operating Temperature</b>	-150...350° F (-101...177° C)	
<b>Pressure Rating*</b>	800 or 5000 psi	
<b>End Connections</b>	NPT, BSP, Victaulic®, flange, hose barbed	
<b>Turndown Ratio</b>	10:1	
<b>Accuracy</b>	±1% of reading for 7/8 in. and larger meters	
	±1% of reading over the upper 70% of the measuring range for 3/8, 1/2, and 3/4 in. meters	
<b>Repeatability</b>	±0.1%	
<b>Calibration</b>	Water (NIST traceable calibration)	
<b>Pickup</b>	B111109	
<b>Certifications</b>	CSA Class I Div 1, Groups C & D Class II Div 1, Groups E, F & G: intrinsically safe**	
	CSA Class I Div 1 Groups C,D; complies to UL 1203 and CSA 22.2 No. 30	
	Met Labs File No. E112860 (for explosion proof models only)	

\* Consult factory for pressure ratings for flanged meters.

\*\* Consult factory for ordering options

## INSTALLATION

### **⚠ WARNING**

**PRESSURE IN EXCESS OF ALLOWABLE RATING MAY CAUSE THE HOUSING TO BURST AND CAUSE SERIOUS PERSONAL INJURY.**

### **⚠ AVERTISSEMENT**

**LA PRESSION AU-DESSUS DE L'ESTIMATION PERMISE PEUT FAIRE ÉCLATER ET CAUSER LE LOGEMENT LE DOMMAGE CORPOREL SÉRIEUX.**

1. Check the internals of the flow meter for any foreign material. Make sure the turbine rotor spins freely prior to installation. Also, check fluid lines and remove any debris found.
2. Install the flow meter with the flow arrow, etched on the exterior of the meter body, pointing in the direction of fluid flow. Though the meter is designed to function in any position, where possible, install it horizontally with the conduit adapter facing upward.
3. Thread a magnetic pickup (Badger Meter model B111109 or equivalent) into the conduit adapter completely finger tight without forcing. Secure with a lock nut if supplied.
4. Install conduit or other fittings suitable for the installation area onto the conduit adapter hub on the flow meter.

All Badger Meter Model 1100 turbine meters use stainless steel and tungsten carbide construction materials. Make sure the operating fluid is compatible with these materials. Incompatible fluids can cause deterioration of internal components and cause a reduction in meter accuracy.

The measured liquid should be free of any large particles that may inhibit rotation of the turbine blades. If particles are present, install a mesh strainer upstream before operating the flow meter. See *Table 1* for strainer recommendations.

Part Number	Strainer Mesh	Clearance	Filter Size
B110-375	60	0.0092 in.	260 µm
B110-500	60	0.0092 in.	260 µm
B110-750	60	0.0092 in.	260 µm
B110-875	60	0.0092 in.	260 µm
B111-110	60	0.0092 in.	260 µm
B111-115	20	0.0340 in.	0.86 mm
B111-120	10	0.0650 in.	1.6 mm
B111-121	20	0.0340 in.	0.86 mm
B111-130, B117-130	8	0.0900 in.	2.3 mm
B111-140, B117-140	10	0.0650 in.	1.6 mm
B111-160	4	0.1875 in.	4.8 mm
B111-180	8	0.0900 in.	2.3 mm
B111-200	4	0.1875 in.	4.8 mm

Table 1: Strainer mesh installation details

The preferred plumbing setup is one containing a bypass line (see *Figure 3 on page 6*) that allows meter inspection and repair without interrupting flow. If a bypass line is not used, it is important that all control valves be located downstream of the flow meter (see *Figure 4 on page 6*).

### **⚠ CAUTION**

**STRIKING AN EMPTY METER WITH HIGH VELOCITY FLOW STREAM CAN CAUSE DAMAGE.**

### **⚠ ATTENTION**

**DES DOMMAGES PEUVENT ÊTRE PROVOQUÉS EN FRAPPANT UN MÈTRE VIDE AVEC UN JET D'ÉCOULEMENT DE VITESSE ÉLEVÉE.**

Any restriction in the flow line may cause the liquid to flash. If necessary, install air eliminators so that the meter is not incorrectly measuring entrained air or gas.

Badger Meter recommends installation of a minimum straight pipe length, equal to ten (10) pipe diameters on the upstream side and five (5) diameters on the downstream side of the flow meter. Otherwise, meter accuracy may be affected. Piping should be the same size as the meter bore or threaded port size.

Severe pulsation and mechanical vibration affect accuracy and shorten the life of the meter. If this condition is present, consider using a flow meter possessing superior resistance to pulsation and vibration like the Badger Meter QuikSert. Do not locate the flow meter or connection cable close to electric motors, transformers, sparking devices, high voltage lines, or place connecting cable in conduit with wires furnishing power for such devices. These devices can induce false signals in the flow meter coil or cable, causing the meter to read inaccurately.

If problems arise with the flow meter, consult the *Troubleshooting Guide on page 12*. If further problems arise, consult the factory.

Replace damaged internal components of the turbine flow meter with a turbine meter repair kit available from Badger Meter. See *Turbine Replacement on page 8*.

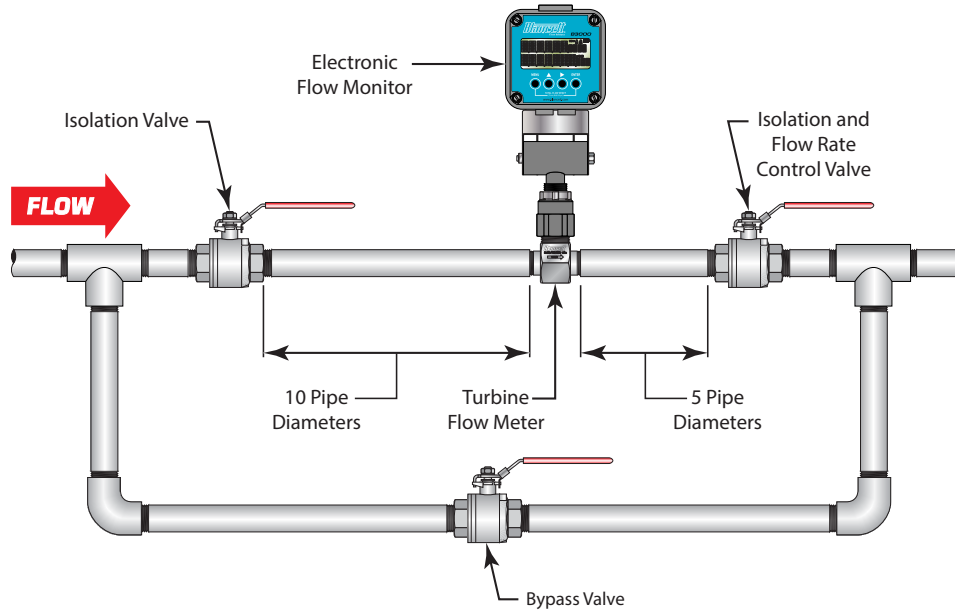


Figure 3: Meter installation with a bypass line

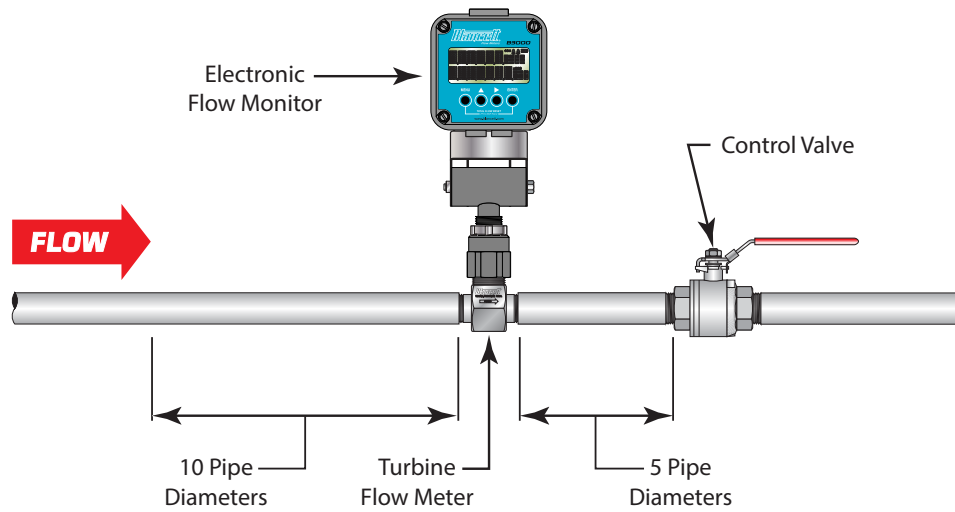


Figure 4: Meter installation without a bypass line

## PRESSURE DROP IN WATER

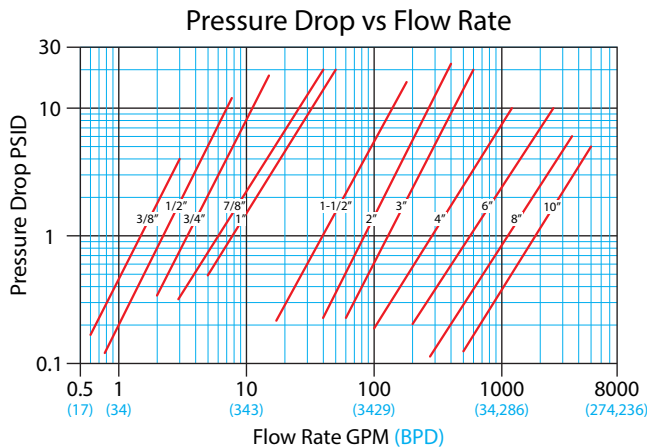


Figure 5: English units pressure drops

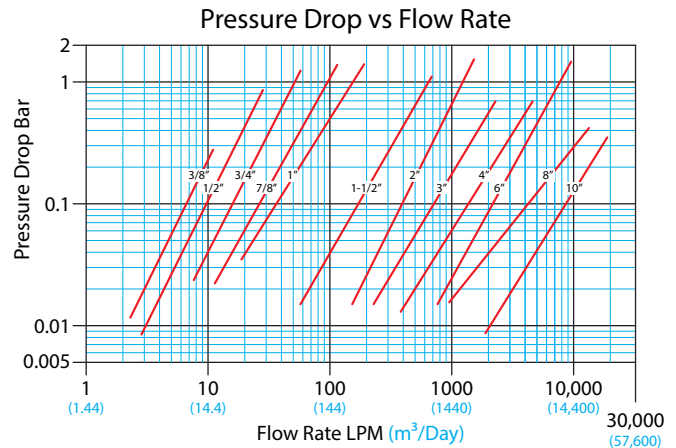


Figure 6: Metric units pressure drops

## OPERATIONAL STARTUP

Follow these steps when installing and starting the meter.

### ⚠ WARNING

**MAKE SURE TO SHUT OFF FLUID FLOW AND RELEASE PRESSURE IN THE LINE BEFORE ATTEMPTING TO INSTALL THE METER IN AN EXISTING SYSTEM.**

### ⚠ AVERTISSEMENT

**ASSUREZ-VOUS QUE LE FLUX DE FLUIDE A ÉTÉ COUPÉ ET DE LA PRESSION DANS LA LIGNE A ÉTÉ LIBÉRÉE AVANT D'ESSAYER D'INSTALLER LE MÈTRE DANS UN SYSTÈME ACTUEL.**

After meter installation, close the isolation valves and open the bypass valve. Allow liquid to flow through the bypass valve for sufficient time to eliminate any air or gas in the flow line.

### ⚠ CAUTION

**HIGH VELOCITY AIR OR GAS MAY DAMAGE THE INTERNAL COMPONENTS OF THE METER.**

### ⚠ ATTENTION

**DES DOMMAGES PEUVENT ÊTRE PROVOQUÉS EN FRAPPANT UN MÈTRE VIDE AVEC UN JET D'ÉCOULEMENT DE VITESSE ÉLEVÉE.**

1. Open the upstream isolating valve slowly to eliminate hydraulic shock while charging the meter with the liquid. Open the valve to full open.
2. Open downstream isolating valve to permit meter to operate.
3. Close the bypass valve to a full closed position.
4. Adjust the downstream valve to provide the required flow rate through the meter.

**NOTE:** If necessary, use the downstream valve as a control valve.

## TURBINE REPLACEMENT

The Model 1100 turbine flow meter uses wear-resistant moving parts to provide trouble-free operation and long service life. Designed for easy field service of a damaged flow meter, Model 1100 repair kits replace only the internal parts, not the entire flow meter. Repair parts use stainless steel alloys and tungsten carbide construction materials.

Each repair kit is factory calibrated to provide accuracy throughout the entire flow range. Each kit is complete and includes a new K-factor, which is the calibrated number of pulses generated by each gallon of liquid. Recalibration of the monitor or other electronics uses the K-factor to provide accurate output data.

**NOTE:** If the meter repair kit part number ends in NCC (no calibration), it was not factory calibrated. For these repair kits, use the nominal K-factor.

### Turbine Replacement Kit Part Number

Flow Meter Size	Replacement Kit Fits Meter Part Number	Repair Kit Part Number
3/8 in.	B110-375, B110-375-1/2	B251-102
1/2 in.	B110-500, B110-500-1/2	B251-105
3/4 in.	B110-750, B110-750-1/2	B251-108
7/8 in.	B110-875	B251-109
1 in.	B111-110	B251-112
1-1/2 in.	B111-115	B251-116
2 in. Low	B111-121	B251-116
2 in.	B111-120	B251-120
3 in.	B111-130	B251-131
4 in.	B111-140	B251-141
6 in.	B111-160	B251-161
8 in.	B111-180	B251-181
10 in.	B111-200	B251-200
Standard Magnetic Pick-up	All Meter Sizes	B111109

Table 2: Repair kit part numbers

### Turbine Assembly Removal

#### WARNING

**HIGH-PRESSURE LEAKS ARE DANGEROUS AND MAY CAUSE PERSONAL INJURY. MAKE SURE TO SHUT OFF FLUID FLOW AND RELEASE RESIDUAL PRESSURE IN THE LINE BEFORE ATTEMPTING TO REMOVE THE METER.**

#### AVERTISSEMENT

**LES FUITES À HAUTE PRESSION SONT DANGEREUSES ET PEUVENT CAUSER LE DOMMAGE CORPOREL. ASSUREZ-VOUS QUE LE FLUX DE FLUIDE A ÉTÉ COUPÉ ET DE LA PRESSION DANS LA LIGNE A ÉTÉ LIBÉRÉE AVANT D'ESSAYER D'ENLEVER LE MÈTRE.**



## Disassembly

1. Refer to *Figure 7*, *Figure 8* and *Figure 9* for relative positions of repair kit components.
2. Remove the magnetic pickup from the meter body to avoid damage during repair.
3. Remove the retaining ring from one end of the meter.
4. Remove the rotor support from the body. If the rotor support is jammed in the body, use a pair of pliers or vise-grips to break the rotor support free.
5. The rotor may also be removed at this time.

**NOTE:** 4 in. and larger meters have two retaining rings (one on either side of the rotor) that require removal before the rotor can be removed (see *Figure 9*).

6. Remove the retaining ring from the opposite side of the meter.
7. Remove the second rotor support.

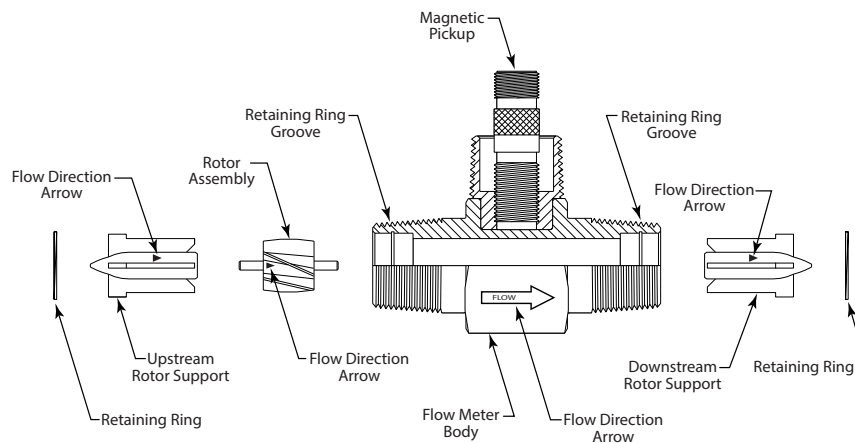


Figure 7: Component positions for B110-375...B111-115 and B111-121

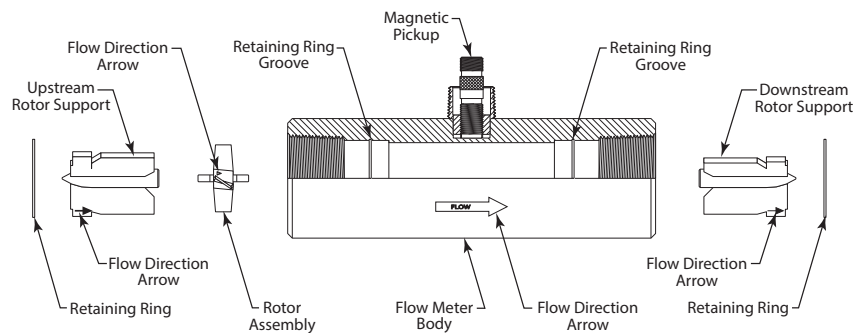


Figure 8: Component positions for B111-120 and B111-130

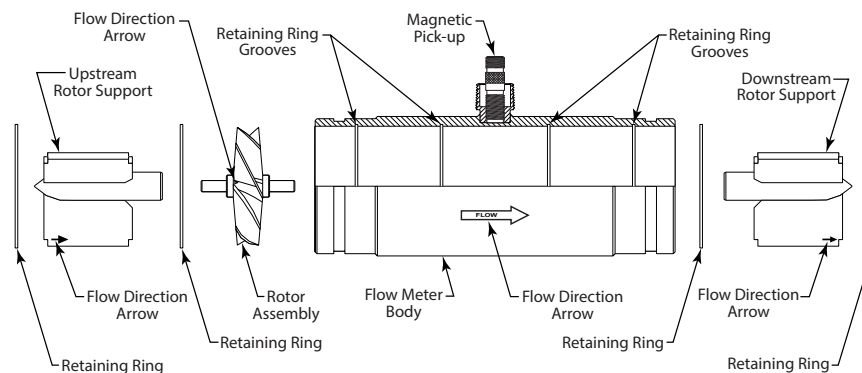


Figure 9: Component positions for B111-140 and B111-200

## New Turbine Kit Installation

### IMPORTANT

Before reassembly, note that an arrow is cast or engraved on each component. The arrow indicates the primary flow direction. When reassembled, the arrowheads must point in the direction of the fluid flow. The arrows must also be oriented in the up position on both rotor supports. The magnetic pickup side of the body signifies the up position. Performance of repair kit calibration is in the up position. Reinstallation of the repair kit in the up position provides continuation of accurate measurements. Figure 7, Figure 8, and Figure 9 show the proper alignment and orientation of the repair kits.

**NOTE:** Fractional size (3/8 in., 1/2 in. and 3/4 in.) rotors do not contain a cast or engraved arrow. However, a colored cap on the downstream side of the rotor shaft indicates flow direction. Remove this cap before assembly, noting flow direction.

1. Install one of the rotor supports into the body bore, noting the orientation of the arrow.
2. Secure a retaining ring in the groove. Check for complete installation of retaining rings in each groove.

**NOTE:** 4 in. and larger meters have a retaining ring at both ends of the rotor (see Figure 9).

3. Insert the rotor and second rotor support in the opposite side of the body, noting the orientation of the arrow.
4. Secure the second retaining ring in the opposite groove, using the same procedure as in step 2 above.

### CAUTION

**EXCESS AIR PRESSURE MAY DAMAGE THE ROTOR AND BEARINGS BY OVER SPINNING.**

### ATTENTION

**LA PRESSION ATMOSPHÉRIQUE EXCESSIVE PEUT ENDOMMAGER LE ROTOR ET LES ROULEMENTS PRÈS AU-DESSUS DE LA ROTATION.**

5. Check the meter by lightly puffing air through the assembly. If the rotor does not turn freely, disassemble the meter and remove anything that might obstruct movement of the rotor.

**NOTE:** At this time, electronics require recalibration. Refer to the display's user manual. If there are any questions on recalibration, contact Badger Meter, Inc. or the manufacturer of the associated electronics.

6. Install the magnetic pickup.

## PART NUMBER INFORMATION

Part Number	Bore Size	End Connections	Max. PSI	Flow Ranges			Strainer Mesh	Approx. K-factor Pulse/Gal	Meter Weight (lb)	End to End Length
				gpm (lpm)	bpd	m3/d				
<b>B110-375-½</b>	3/8 in. (9.5 mm)	1/2 in. male NPT	5000	0.6...3 (2.3...11.4)	20...100	3.3...16	60	18000	1	3.00 in. (76.20 mm)
<b>B110-500-½</b>	1/2 in. (12.7 mm)	1/2 in. male NPT	5000	0.75...7.5 (2.8...28.4)	25...250	4.1...41	60	13000	1	3.00 in. (76.20 mm)
<b>B110-750-½</b>	3/4 in. (19.1 mm)	1/2 in. male NPT	5000	2...15 (7.6...56.7)	68...515	10.9...81.75	60	3300	1	3.00 in. (76.20 mm)
<b>B110-375</b>	3/8 in. (9.5 mm)	1 in. male NPT	5000	0.6...3 (2.3...11.4)	20...100	3.3...16	60	18000	2	4.00 in. (101.60 mm)
<b>B110-500</b>	1/2 in. (12.7 mm)	1 in. male NPT	5000	0.75...7.5 (2.8...28.4)	25...250	4.1...41	60	13000	2	4.00 in. (101.60 mm)
<b>B110-750</b>	3/4 in. (19.1 mm)	1 in. male NPT	5000	2...15 (7.5...56.7)	68...515	10.9...81.75	60	3300	2	4.00 in. (101.60 mm)
<b>B110-875</b>	7/8 in. (22.2 mm)	1 in. male NPT	5000	3...30 (11.4...113.6)	100...1000	16...160	60	3100	2	4.00 in. (101.60 mm)
<b>B111-110</b>	1 in. (25.4 mm)	1 in. male NPT	5000	5...50 (18.9...189.3)	170...1700	27.25...272.5	40	870	2	4.00 in. (101.60 mm)
<b>B111-115</b>	1-1/2 in. (38.1 mm)	1-1/2 in. male NPT	5000	15...180 (56.8...681.4)	515...6000	82...981	20	330	5	6.00 in. (152.40 mm)
<b>B111-121</b>	1-1/2 in. (38.1 mm)	2 in. male NPT	5000	15...180 (56.8...681.4)	515...6000	82...981	20	330	6	6.00 in. (152.40 mm)
<b>B311-066</b>	1-1/2 in. (38.1 mm)	2 in. grooved end	5000	15...180 (56.8...681.4)	515...6000	82...981	20	330	6	6.00 in. (152.40 mm)
<b>B111-120</b>	2 in. (50.8 mm)	2 in. female NPT	5000	40...400 (151.4...1514.2)	1300...13000	218...2180	20	52	14	10.00 in. (245.00 mm)
<b>B311-004</b>	3 in. (76.2 mm)	3 in. male NPT	800	60...600 (227.1...2271.2)	2100...21000	327...3270	10	57	15	12.50 in. (317.50 mm)
<b>B111-130</b>	3 in. (76.2 mm)	3 in. grooved end	800	60...600 (227.1...2271.2)	2100...21000	327...3270	10	57	15	12.50 in. (317.50 mm)
<b>B311-084</b>	4 in. (101.6 mm)	4 in. male NPT	800	100...1200 (378.5...4542.5)	3400...41000	545...6540	10	29	20	12.00 in. (304.80 mm)
<b>B111-140</b>	4 in. (101.6 mm)	4 in. grooved end	800	100...1200 (378.5...4542.5)	3400...41000	545...6540	10	29	20	12.00 in. (304.80 mm)
<b>B311-085</b>	6 in. (152.4 mm)	6 in. male NPT	800	200...2500 (757.1...9463.5)	6800...86000	1090...13626	4	7	46	12.00 in. (304.80 mm)
<b>B111-160</b>	6 in. (152.4 mm)	6 in. grooved end	800	200...2500 (757.1...9463.5)	6800...86000	1090...13626	4	7	46	12.00 in. (304.80 mm)
<b>B111-180</b>	8 in. (203.2 mm)	8 in. grooved end	800	350...3500 (1324.9...13248.9)	12000...120,000	1363...19076	4	3	56	12.00 in. (304.80 mm)
<b>B111-200</b>	10 in. (254 mm)	10 in. grooved end	800	500...5000 (1892.7...18927.1)	17000...171,000	2725...27252	4	1.6	80	12.00 in. (304.80 mm)

<sup>1</sup> Includes Standard Mag Pickup, p/n B111109, -150...330° F (-101...165° C), suitable for all mounting styles

## TROUBLESHOOTING GUIDE

Trouble	Possible Cause	Remedy
Meter indicates higher than actual flow rate	Cavitation. Debris on rotor support. Build up of foreign material on meter bore. Gas in liquid.	Increase back pressure. Clean meter. Clean meter.  Install gas eliminator ahead of meter.
Meter indicates lower than actual flow rate.	Debris on rotor. Worn bearing. Viscosity higher than calibrated.	Clean meter and add filter. Clean meter and add filter. Recalibrate monitor.
Erratic system indication, meter alone works well (remote monitor application only).	Ground loop in shielding.	Ground shield one place only. Look for internal electronic instrument ground. Reroute cables away from electrical noise.
Indicator shows flow when shut off.	Mechanical vibration causes rotor to oscillate without turning.	Isolate meter.
No flow indication. Full or partial open position.	Fluid shock, full flow into dry meter or impact caused bearing separation or broken rotor shaft.	Rebuild meter with repair kit and recalibrate monitor. Move to location where meter is full on startup or add downstream flow control valve.
Erratic indication at low flow, good indication at high flow.	Rotor has foreign material wrapped around it.	Clean meter and add filter.
No flow indication.	Faulty pickup.	Replace pickup.
System works perfect, except indicates lower flow over entire range.	By-pass flow, leak.	Repair or replace bypass valves, or faulty solenoid valves.
Meter indicating high flow, upstream piping at meter smaller than meter bore.	Fluid jet impingement on rotor.	Change piping.
Meter indicating low flow, upstream piping at meter smaller than meter bore.	Viscosity lower than calibrated.	Change temperature, change fluid or recalibrate meter.

### Control. Manage. Optimize.

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**Blancett**<sup>®</sup>

Turbine Flow Meters

## Turbine Flow Meter

QuikSert<sup>®</sup>

### DESCRIPTION

The QuikSert in-line turbine flow meter was developed for liquid applications where accuracy and dependability are needed. QuikSert's stainless steel body incorporates a helical turbine with tungsten carbide shaft and bearing. It provides an efficient, long service life and a cost-effective solution for your measurement requirements.

Simple in design and construction, QuikSert uses 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 for easy, one-man installation.

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

### FEATURES

- Accurate and repeatable flow measurement from 0.6...3 gpm (20...100 bpd) to 500...5000 gpm (17,000...171,000 bpd).
- Unique between-the-flange design eliminates need for mating flanges.
- Superior materials of construction for high performance in aggressive environments.
- Wafer-style mounting configurations for limited space requirements.
- Modified flow straighteners for enhanced fluid dynamics.

### 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 pickup, an AC voltage pulse is generated. These pulses provide an output frequency that is proportional to volumetric flow.

### REPAIR KITS

Factory calibrated repair kits are available for field service. A repair kit contains six screws, two rotor supports, one rotor assembly, and a K-factor tag. The rotor support assembly is retained in proper position within the meter body by the support screws. These screws allow for quick and easy disassembly and replacement of the meter's internal components. QuikSert repair kits are designed and manufactured for use with Blancett turbines and other flow meters of similar design; contact the factory for further details.

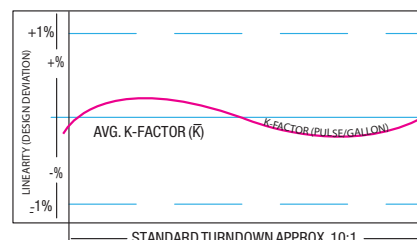
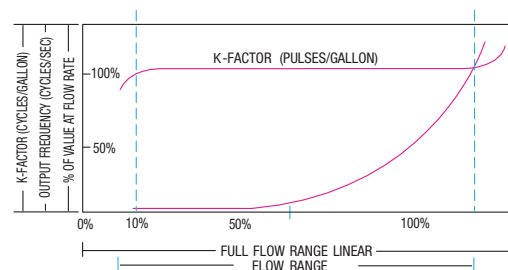


### K-FACTOR

The K-factor represents the number of output pulses transmitted per gallon of fluid passing through the turbine meter. Each turbine has a unique K-factor. However, turbine meters are not functionally consistent throughout the full flow range of the meter.

There are several forms of friction inherent in turbine meters that slow down the rotational movement of the turbine rotor. These frictional forces include: magnetic drag, created by electromagnetic force of pickup transducers; mechanical drag, due to bearing friction; and viscous drag, produced by flowing fluid. See charts below.

As flow increases, the frictional forces are minimized and the free-wheeling motion of the turbine rotor becomes more linear (proportional to flow). The K-factor becomes relatively constant and linear throughout the balance of the linear flow range. This is approximately a 10:1 turndown ratio from the maximum flow rate down to the minimum flow rate.



**Badger Meter**

TRB-DS-01381-EN-04 (April 2017)

## Product Data Sheet

## SPECIFICATIONS

<b>Materials of Construction</b>	Body and internal wetted parts	316L stainless steel
	Bearings	Tungsten carbide
	Turbine	CD4MCU stainless steel
	Shaft	Tungsten carbide
<b>Accuracy</b>	±1% of reading for 7/8 in. and larger meters ±1% of reading over the upper 70% of the measuring range for 3/8 in., 1/2 in. and 3/4 in. meters	
<b>Repeatability</b>	±0.1%	
<b>Calibration</b>	Water; NIST Traceable Calibration Certificate available, consult factory for details	
<b>Pressure Rating</b>	See pressure rating table below	
<b>Operating Temperature</b>	-150...350° F (-101...177° C) standard Temperatures to 450° F (232° C) with high-temp pickup, consult factory for details	
<b>End Connections</b>	Wafer-style ASME/ANSI B16.5-1996	
<b>Approvals</b>	For Explosion proof models only: Class I Div 1 Groups C,D; Complies to UL 1203 and CSA 22.2 No. 30 Met Labs File No. E112860	

### Pressure Rating

The pressure rating of the meter is dependent upon the class of ANSI flanges between which the meter is to be mounted. The pressure rating chart below is based on Carbon Steel at 100° F (37.8° C).

Flange Class (ANSI)	150	300	600	900
Working Pressure (psi)	285	740	1480	2220
Working Pressure (MPa)	1.97	5.10	10.20	15.31
* Test Pressure (psi)	427.5	1110	2220	3330
* Test Pressure (MPa)	2.95	7.65	15.31	22.98

\* Test pressure based on 1.5 safety factor

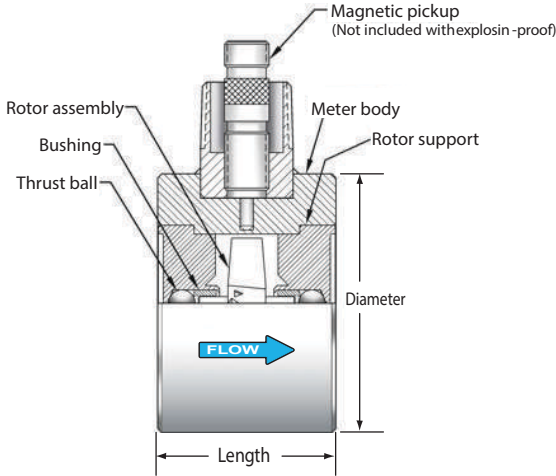
## METER AND REPAIR KITS

Part Number*	Meter Bore Size × Line Size	Flow Ranges			Strainer Mesh	Approx. K-Factor pulses/US gal	Max. Pressure Drop (psi)	Dimensions Dia. × length (in.)	Repair Kit Part Number
		gpm	bpd	m <sup>3</sup> /d					
B131-038	3/8" × 1"	0.6...3	20...100	3.3...16	60	18,000	3.75	2 × 4	B253-102
B131-050	1/2" × 1"	0.75...7.5	25...250	4.1...41	60	13,000	6.5	2 × 4	B253-105
B131-075	3/4" × 1"	2...15	68...515	10.9...81.75	60	3300	18	2 × 4	B253-108
B131-088	7/8" × 1"	3...30	100...1000	16...160	60	3100	20	2 × 4	B253-109
B131-100	1" × 1"	5...50	170...1700	27.25...272.5	60	870	20	2 × 4	B253-112
B132-050	1/2" × 2"	0.75...7.5	25...250	4.1...41	60	13,000	12	3.62 × 2.5	B253-205
B132-075	3/4" × 2"	2...15	68...515	10.9...81.75	60	3300	18	3.62 × 2.5	B253-208
B132-088	7/8" × 2"	3...30	100...1000	16...160	60	3100	20	3.62 × 2.5	B253-209
B132-100	1" × 2"	5...50	170...1700	27.25...272.5	40	870	20	3.62 × 2.5	B253-212
B132-150	1-1/2" × 2"	15...180	515...6000	82...981	20	330	16	3.62 × 2.5	B253-216
B132-200	2" × 2"	40...400	1300...13,000	218...2180	20	52	9	3.62 × 2.5	B253-220
B132-250	2" × 3"	40...400	1300...13,000	218...2180	20	52	10	3.62 × 4.25	B253-220
B133-300	3" × 3"	60...600	2100...21,000	327...3270	10	57	10	5 × 4.25	B253-330
B134-400	4" × 4"	100...1200	3400...41,000	545...6540	10	29	10	6.18 × 5	B253-440
B136-600	6" × 6"	200...2500	6800...86,000	1,090...13,626	4	7	10	8.5 × 5.75	B253-660
B138-800	8" × 8"	350...3500	12,000...120,000	1,363...19,076	4	3	10	10.62 × 6.25	B253-880
B139-900	10" × 10"	500...5000	17,000...171,000	2,725...27,252	4	1.6	10	12.75 × 6.75	B253-990

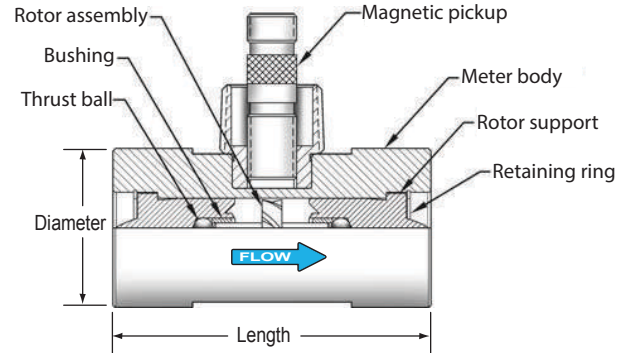
\* Part number includes turbine meter and standard magnetic pickup. For other pickup options, see "Pickup Options" on page 3. For larger sizes, consult factory. Note: Insert a "C" before dash for turbine meters with explosion proof rating. No pickup included. Example: B131C-100

**DIAGRAMS**

**Models B132-050...B139-900**



**Models B131-038...B131-100**




**INSTALLATION KITS**

QuikSert Installation Kits are offered to make set up trouble-free and to ensure the proper fit. Each kit includes: studs, nuts, gaskets, and spacer rings. See table below for ordering information.

Size	150#	300#	600#	900#
1 in. (25.4 mm)	B253-1HK-150	B253-1HK-300	B253-1HK-600	B253-1HK-900
2 in. (50.8 mm)	B253-2HK-150	B253-2HK-300	B253-2HK-600	B253-2HK-900
3 in. (76.2 mm)	B253-3HK-150	B253-3HK-300	B253-3HK-600	B253-3HK-900
4 in. (101.6)	B253-4HK-150	B253-4HK-300	B253-4HK-600	B253-4HK-900
6 in. (152.4 mm)	B253-6HK-150	B253-6HK-300	B253-6HK-600	B253-6HK-900
8 in. (203.2 mm)	B253-8HK-150	B253-8HK-300	B253-8HK-600	B253-8HK-900
10 in. (254.0 mm)	B253-9HK-150	B253-9HK-300	B253-9HK-600	B253-9HK-900

**PICKUP OPTIONS**

Part Number	Magnetic Pickup	Temperature Range
B111109	Standard	-150...330° F (-101...165° C)
B220111	High temperature	-450...450° F (-26...232° C)
B220210	With preamplifier	-40...250° F (-40...121° C)
B220243	Intrinsically safe, FM rated	-40...250° F (-40...21° C)
B111126	ATEX  II 1G; EEx ia IIC T5	-58...248° F (-50...120° C)





# Blancett®

Turbine Flow Meters

## Monitor de flujo

### Serie B2900

### DESCRIPCIÓN

El monitor de flujo B2900 incorpora tecnología de vanguardia de procesamiento de señales digitales que está diseñada para brindar una flexibilidad excepcional a un precio muy asequible. Pese a estar diseñado para su uso con sensores de flujo Blancett, este monitor se puede utilizar casi con cualquier sensor de flujo que produzca una salida de CA de baja amplitud o una señal de cierre de contacto.

### FUNCIONAMIENTO

Este monitor puede aceptar las señales de entrada de frecuencia de bajo nivel que habitualmente se encuentran en sensores de flujo de turbina. La señal de salida de este tipo de sensores es una frecuencia proporcional al caudal. El monitor B2900 emplea la información de la frecuencia para calcular el caudal y el flujo total. Con los botones de programación, se puede seleccionar las unidades del caudal, las unidades totales y los intervalos de tiempo de la unidad, entre otras funciones. Si fuera necesario, el monitor se puede reconfigurar fácilmente in situ. Por último, se puede elegir entre mostrar simultáneamente el caudal y el total, o alternar entre el caudal y el total general.

El monitor ofrece funciones de comunicación de avanzada a través de un bus RS485 con salidas Modbus RTU y de control.

El paquete es un gabinete NEMA 4X de policarbonato.

### APLICACIONES

El monitor B2900 es apto para aplicaciones con una amplia variedad de necesidades de medición. Algunas de las industrias más comunes son:

- Aplicaciones secundarias de recuperación de petróleo
- Saneamiento y recuperación
- Fraccionamiento/refraccionamiento
- Metano de yacimiento de carbón
- Cumplimiento de las normas y responsabilidad ambiental
- Sustancias químicas industriales
- Aplicaciones de procesamiento de productos químicos agresivos
- Fabricación de semiconductores
- Producción y distribución de fertilizantes
- Fabricación de pesticidas
- Procesamiento de líquidos por lotes y enfriamiento de agua



### CARACTERÍSTICAS

- Sólidos parámetros de alarma que ofrecen una advertencia más rápida cuando ocurre algún cambio en el proceso o la tubería.
- Mayor control y visibilidad de las operaciones por lotes.
- Opciones avanzadas de conectividad que le permiten conectar los medidores a su red para las funciones de monitoreo remoto y automatización de procesos.
- Opciones actualizadas de presentación y totalización que ofrece más información sobre el flujo, incluida la presentación en simultáneo del caudal y el total, además de totales estándar, por lote y general.
- Varias opciones de montaje permiten usar un modelo B2900 para su actividad.

### ESTRUCTURA DEL NÚMERO DE PIEZA

<b>Pantalla Blancett B2900</b>	<input type="text"/>	<input type="text"/>	<input type="text"/>	-	<input type="text"/>
<b>Modelo</b>					
Pantalla Blancett B2900	<b>B29</b>				
<b>Modelo</b>					
Avanzado	<b>A</b>				
<b>Montaje</b>					
Medidor					<b>M</b>
Remoto					<b>R</b>
Giratorio					<b>S</b>
De mano					<b>H</b>
<b>Unidades de medida</b>					
Seleccionables por el cliente					<b>CS</b>



## Badger Meter

DSY-DS-02985-ES-01 (diciembre de 2018)

# Ficha técnica del producto

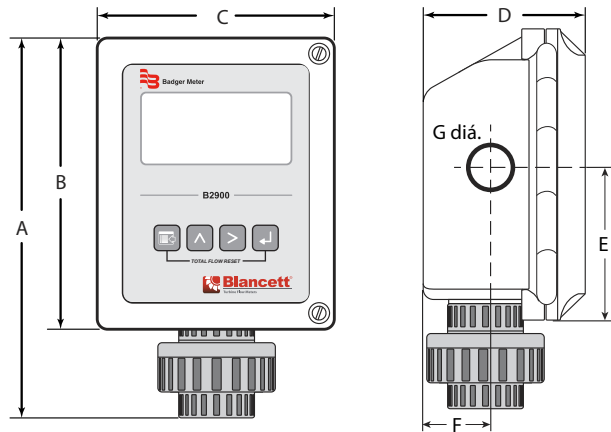


## ESPECIFICACIONES

<b>Pantalla</b>	Común	Muestra la tasa y el total al mismo tiempo			
		LCD con matriz de 5 x 7 puntos, fluido STN			
	Tasa de 6 dígitos, números de 0,5 in (12,7 mm)				
	Total de 7 dígitos, números de 0,5 in (12,7 mm)				
	Etiquetas de unidades de ingeniería de 0,34 in (8,6 mm)				
	Indicadores	Alarma 1 (A), Alarma 2 (B), Nivel de la batería (0000), Comunicaciones RS485 (COM)			
<b>Alimentación</b>	Comutación automática entre la batería interna y la corriente en bucle externa; incluye aislamiento entre la corriente en bucle y otras E/S				
	Batería	La batería de litio de 3,6 VCC de tipo D ofrece hasta 6 años de vida útil <b>Nota:</b> La activación de Modbus a una tasa de transferencia de 19 200 o superior sin corriente en bucle reduce la vida útil de la batería a 1 año			
	Bucle	4 a 20 mA, dos cables, límite de 25 mA, protegido contra polaridad inversa, pérdida del bucle de 7 VCC			
<b>Entradas</b>	Captador magnético	Rango de frecuencia	1 a 3500 Hz		
		Precisión de la medición de frecuencia	±0,1 %		
		Protección contra sobretensión	28 VCC		
		Sensibilidad de disparo	30 mV <sub>p-p</sub> (alta) o 60 mV <sub>p-p</sub> (baja) - (seleccionada por el puente de la placa de circuitos)		
	Pulso amplificado	Conexión directa a la señal amplificada (salida preamplificada del sensor)			
<b>Salidas (Outputs)</b>	Analógicas de 4 a 20 mA	Bucle de corriente de dos cables y 4 a 20 mA			
		Límite de corriente de 25 mA			
	Pulso del totalizador	Un pulso por cada incremento del dígito menos significativo ( <b>Least Significant Digit, LSD</b> ) del totalizador			
		Tipo de pulso (seleccionado por el puente de la placa de circuitos)	Transistor de colector abierto Aislado ópticamente (Iso)		
			FET de drenaje abierto no aislado		
		Voltaje máximo	28 VCC		
		Capacidad máxima de corriente	100 mA		
		Frecuencia de salida máxima	16 Hz		
	Amplitud de pulso	30 milisegundos, fija			
	Alarmas de estado	Tipo	Transistor de colector abierto		
			Caudal ajustable con banda muerta y fase programables		
Voltaje máximo		28 VCC			
Corriente máxima		100 mA			
	Resistor pullup	Requerido en forma externa: 2,2 k ohmios mínimos, 10 k ohmios máximos			
<b>Comunicaciones digitales Modbus</b>	Modbus RTU vía RS485, 127 unidades de dirección/Red de 2 cables más conexión a tierra, tasa de transmisión seleccionable: 9600, 19 200, 38 400, 57 600 o 115 200, formatos de entero largo y de presión simple IEEE754; recuperación de datos: caudal, totalizador de la tarea, total general, estado de alarma y nivel de la batería; escritura: reseteo del totalizador de la tarea, reseteo del total general				
<b>Configuración y protección de datos</b>	Dos contraseñas seleccionables de cuatro dígitos; la contraseña de nivel uno permite solo el reseteo del total de la tarea, la contraseña de nivel dos permite todas las funciones de configuración y reseteo del totalizador				
<b>Certificaciones</b>	Seguridad	Intrínsecamente seguro Clase I División 1, Grupos C, D; Clase II, División 1 Grupos E, F, G			
	Parámetros de la entidad	Bucle de 4 a 20 mA: Vmax = 28 VCC	I <sub>max</sub> = 26 mA	C <sub>i</sub> = 0,5 µF	L <sub>i</sub> = 0 mH
		Salida de pulso: Vmax = 28 VCC	I <sub>max</sub> = 100 mA	C <sub>i</sub> = 0 µF	L <sub>i</sub> = 0 mH
		Reseteo de entrada: Vmax = 5 VCC	I <sub>max</sub> = 5 mA	C <sub>i</sub> = 0 µF	L <sub>i</sub> = 0 mH
		RS485: Vmax = 10 VCC	I <sub>max</sub> = 60 mA	C <sub>i</sub> = 0 µF	L <sub>i</sub> = 0 mH
		Entrada de la turbina: Voc = 2,5 V	I <sub>sc</sub> = 1,8 mA	Ca = 1,5 µF	La = 1,65 H
EMC	IEC61326-1; 2004/108/EC				
<b>Precisión de la medición</b>	Precisión habitual	0,05 %			
<b>Tiempo de respuesta (amortiguación)</b>	Tiempo de respuesta habitual	Respuesta de 1 a 100 segundos para la entrada de una medida de cambio, ajustable por el usuario			
<b>Límites ambientales</b>	Límites habituales	-22 a 158 °F (-30 a 70 °C); 0 a 90 % de humedad, sin condensación;			
<b>Capacidad nominal de los materiales y del gabinete</b>	Policarbonato, acero inoxidable, poliuretano, elastómero termoplástico, acrílico; medidor NEMA 4X/IP 66, montaje remoto y giratorio; NEMA/UL/CSA Tipo 4X (IP-66)				
<b>Unidades de ingeniería</b>	Líquido	Galones estadounidenses, litros, barriles de petróleo (42 galones), barriles de líquido (31,5 galones), metros cúbicos, millones de galones, pies cúbicos, millones de litros, acres-pies			
	Gas	Pies cúbicos, miles de pies cúbicos, millones de pies cúbicos, pies cúbicos estándares, pies cúbicos reales, metros cúbicos normales, metros cúbicos reales, litros			
	Tiempo del caudal	Segundos, minutos, horas, días			
	Exponentes del totalizador	0,00, 0,0, x1, x10, x100, x1000			
	Unidades del factor K	Pulsos/galón estadounidense, pulsos/metro cúbico, pulsos/litro, pulsos/pies cúbicos			

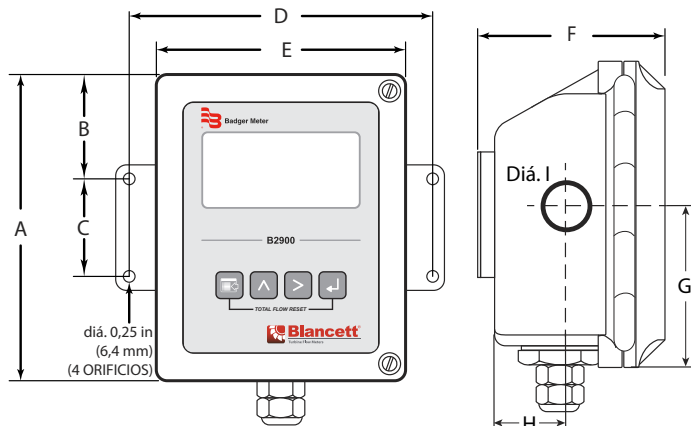
## OPCIONES DE MONTAJE Y DIMENSIONES

### Montaje al medidor



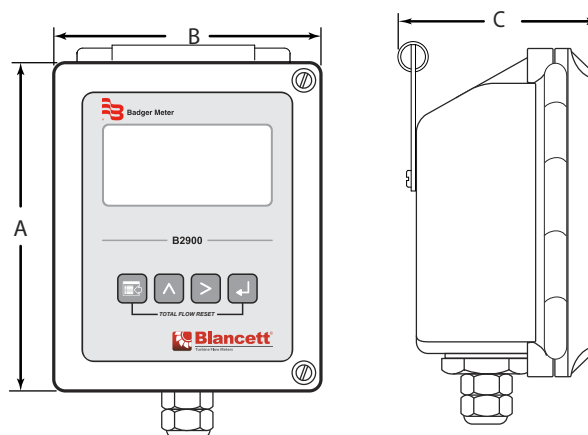
A in (mm)	B in (mm)	C in (mm)	D in (mm)	E in (mm)	F in (mm)	Diá. G in (mm)
9,25 (235,0)	7,00 (177,8)	5,75 (146,0)	4,00 (101,6)	3,45 (87,6)	1,50 (38,1)	0,875 (22,2)

### Montaje remoto



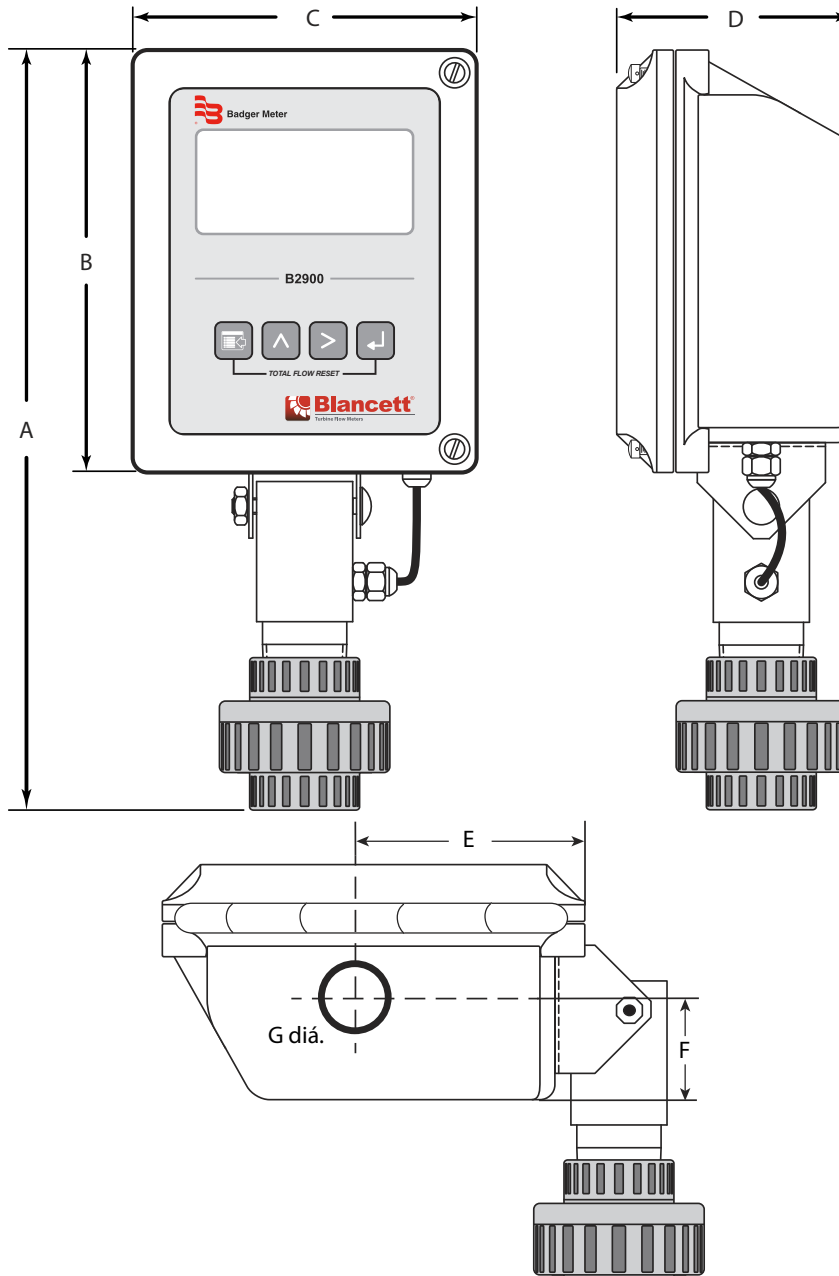
A in (mm)	B in (mm)	C in (mm)	D in (mm)	E in (mm)	F in (mm)	G in (mm)	H in (mm)	Diá. I in (mm)
7,00 (177,8)	2,40 (61,0)	2,25 (57,2)	7,00 (177,8)	5,75 (146,0)	4,38 (111,2)	3,45 (87,6)	1,50 (38,1)	0,875 (22,2)

### De mano



A in (mm)	B in (mm)	C in (mm)
7,00 (177,8)	5,75 (146,0)	4,38 (111,2)

## Montaje giratorio



A in (mm)	B in (mm)	C in (mm)	D in (mm)	E in (mm)	F in (mm)	Diá. G in (mm)
12,25 (311,2)	7,00 (177,8)	5,75 (146,0)	4,00 (101,6)	3,45 (87,6)	1,50 (38,1)	0,875 (22,2)

## Control. Gestión. Optimización.

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[www.badgermeter.com](http://www.badgermeter.com)



**Blancett**<sup>®</sup>  
Turbine Flow Meters

## Flow Monitor

### B3000 Series

#### DESCRIPTION

The B3000 Series flow monitor is a flexible, durable, easy-to-use platform for your flow metering applications. Our trusted flow metering technology now offers a new flow monitor with more options and features than ever before with the B3000 Series.

#### OPERATION

This monitor is capable of accepting low-level frequency input signals typically found in turbine flow sensors. The output signal for these type of sensors is a frequency proportional to the rate of flow. The B3000 monitor uses the frequency information to calculate flow rate and total flow. Through the use of the programming buttons, you can select rate units, total units and unit time intervals among other functions. All B3000 flow monitors come preconfigured from the factory, when ordered with a Blancett flow sensor. If required, however, it can easily be reconfigured in the field. Finally, you can choose between simultaneously showing rate and total, or alternating between rate and grand total.

The monitor is available in three levels of functionality and two packaging options. The base model provides all the functions necessary for the most common flow metering applications. The advanced version adds communications capabilities over an RS485 bus using Modbus RTU and control outputs. The third version is a solar-powered model (NEMA 4X only).

Packaging options include a polycarbonate, NEMA 4X version and an aluminum explosion proof enclosure.

#### APPLICATIONS

The B3000 monitor is suitable for application in a wide variety of metering needs. A few of the more common industries are:

- Secondary oil recovery applications
- Remediation and reclamation
- Fracture/refracture
- Coal bed methane
- Regulatory compliance and environmental accountability
- Industrial chemicals
- Aggressive chemical processing applications
- Semiconductor manufacturing
- Fertilizer production and dispensing
- Pesticide manufacture
- Liquid batching and water cooling



#### FEATURES

- Robust alarm parameters provide faster warning when something changes in the process or pipeline.
- Greater control and greater visibility of batch operations.
- Advanced connectivity options allow you to connect meters to your network for remote monitoring and process automation capabilities.
- Solar, battery, and 4...20 milliamperes loop power options provide the ability to install in a remote location and be up and running immediately, maintain readings and settings during power loss, and a battery life up to 8 years.
- Updated display and totalization options provide more flow information, including simultaneous display of rate and total as well as standard, batch and grand totals.
- Various mounting and enclosure options provide a B3000 model for your operation.



**Badger Meter**

DSY-DS-00691-EN-05 (June 2015)

**Product Data Sheet**

**PART NUMBER CONSTRUCTION**

Blancett B3000 Display		[ ] [ ] [ ] - [ ]	
<b>Model</b>	Blancett B3000 Display	<b>B30</b>	
<b>Model</b>			
Base		<b>B</b>	
Advanced		<b>A</b>	
Solar		<b>S</b>	
Base – Explosion Proof* – Battery & Loop Power		<b>X</b>	
Advanced – Explosion Proof* – Battery & Loop Power		<b>Z</b>	
<b>Mounting</b>			
Meter			<b>M</b>
Remote			<b>R</b>
Swivel			<b>S</b>
<b>Units of Measure</b>	Customer Selectable		<b>CS</b>

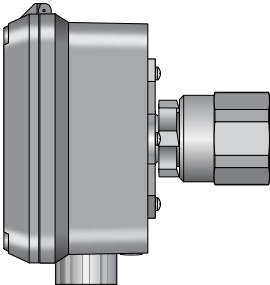

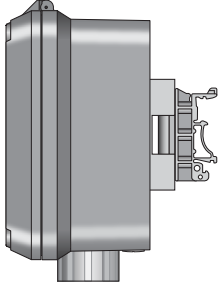

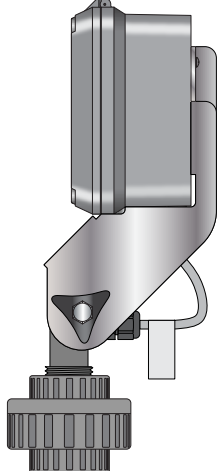
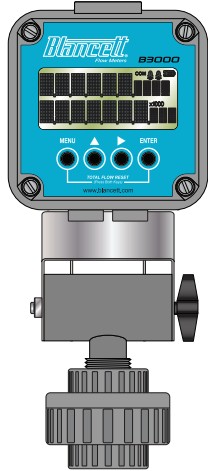


\*For hazardous locations the monitor must be installed on an explosion-proof rated meter. To maintain compliance, kit P/N B280-737 for meter mounting is required.

**SPECIFICATIONS**

<b>Display</b>	Common	Simultaneously shows Rate and Total 5 x 7 Dot Matrix LCD, STN Fluid	
	B30A/B/S	6 Digit Rate, 0.5 inch (12.7 mm) numeric	
		7 Digit Total, 0.5 inch (12.7 mm) numeric	
		Engineering Unit Labels 0.34 inch (8.6 mm)	
B30X/Z	6 Digit Rate, 0.37 inch (9.4 mm) numeric		
	7 Digit Total, 0.37 inch (13 mm) numeric		
	Engineering Unit Labels 0.24 inch (6.1 mm)		
	Annunciators	Alarm 1 (A), Alarm 2 (B), Battery Level (C), RS485 Communications (COM)	
<b>Power</b>	B30A/B/X/Z	Auto switching between internal battery and external loop power; B30A/Z includes isolation between loop power and other I/O	
		Battery	3.6V DC lithium D Cell gives up to 6 years of service life
		Loop	4...20 mA, two wire, 25 mA limit, reverse polarity protected, 7V DC loop loss
	B30S	Internal battery (3.6V DC Nicd) provides up to 30 days of power after 6...8 hours exposure of the integrated photovoltaic cell to direct sunlight.	
<b>Inputs</b>	Magnetic Pickup	Frequency Range	1...3500 Hz
		Frequency Measurement Accuracy	±0.1%
		Over Voltage Protection	28V DC
		Trigger Sensitivity	30 mV <sub>p-p</sub> (High) or 60 mV <sub>p-p</sub> (Low) - (selected by circuit board jumper)
	Amplified Pulse	Direct connection to amplified signal (pre-amp output from sensor)	

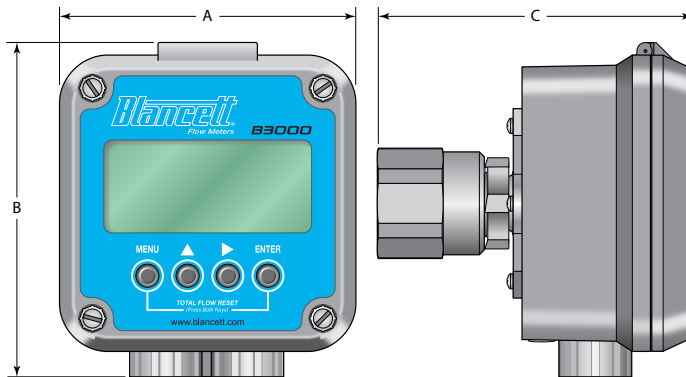
<b>Outputs</b>	Analog 4...20 mA	4...20 mA, two-wire current loop. 25 mA current limit				
	Totalizing Pulse	One pulse for each <b>Least Significant Digit</b> (LSD) increment of the totalizer				
		Pulse Type (selected by circuit board jumper)	Opto-isolated (Iso) open collector transistor			
			Non-isolated open drain FET			
		Maximum Voltage	28V DC			
		Maximum Current Capacity	100 mA			
		Maximum Output Frequency	16 Hz			
	Pulse Width	30 mSec fixed				
	Status Alarms B30A/Z	Type	Open collector transistor Adjustable flow rate with programmable dead band and phase.			
		Maximum Voltage	28V DC			
Maximum Current		100 mA				
Pullup Resistor		External required (2.2 k Ohm minimum, 10 k Ohm maximum)				
Status Alarms B30B/S/X	None					
<b>Modbus Digital Communications</b>	B30A/Z	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.				
	B30B/S/X	None				
<b>Data Configuration and Protection</b>	B30A/B/X/Z	Two four-digit user selectable passwords; level one password enables job total reset only, level two password enables all configuration and totalizer reset functions <b>Not applicable on solar powered units.</b>				
<b>Certifications</b>	Safety	B30A/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. 157-92			
		B30X/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-M1986			
			ATEX II 2 G Ex d IIC T4 Gb and ATEX II D Ex tb IIIC T135 °C Db Complies with Directive 94/9/EC.			
	Entity Parameters	B30A/B only	4...20 mA Loop: Vmax = 28V DC	I <sub>max</sub> = 26 mA	C <sub>i</sub> = 0.5 µF	L <sub>i</sub> = 0 mH
		B30A/B/S only	Pulse Output: Vmax = 28V DC	I <sub>max</sub> = 100 mA	C <sub>i</sub> = 0 µF	L <sub>i</sub> = 0 mH
		B30A/B/S only	Reset Input: Vmax = 5V DC	I <sub>max</sub> = 5 mA	C <sub>i</sub> = 0 µF	L <sub>i</sub> = 0 mH
		B30A only	RS485: Vmax = 10V DC	I <sub>max</sub> = 60 mA	C <sub>i</sub> = 0 µF	L <sub>i</sub> = 0 mH
B30A/B/S only		Turbine Input: Voc = 2.5V	I <sub>sc</sub> = 1.8 mA	Ca = 1.5 µF	La = 1.65 H	
EMC	2004/108/EC					
<b>Measurement Accuracy</b>	Common Accuracy	0.05%				
<b>Response Time (Damping)</b>	Common Response Time	1...100 seconds response to a step change input, user adjustable				
<b>Environmental Limits</b>	Common Limits	-22...158° F (-30...70° C); 0...90% humidity, non-condensing				
<b>Materials and Enclosure Ratings</b>	B30A/B/S	Polycarbonate, stainless steel, polyurethane, thermoplastic elastomer, acrylic; NEMA 4X/IP 66				
	B30X/Z	Copper free, epoxy-coated, aluminum, buna seal, NEMA 4X/IP66				
<b>Engineering Units</b>	Liquid	US Gallons, Liters, Oil Barrels (42 US gallons), Liquid Barrels (31.5 US gallons), Cubic Meters, Million US 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				
	Totalizer Exponents	0.00, 0.0, X1, x10, x100, x1000				
	K factor Units	Pulses/US gallon, pulses/cubic meter, pulses/liter, pulses/cubic foot				

**MOUNTING STYLES**

<p><b>Meter Mount</b></p> <ul style="list-style-type: none"> <li>• Monitor is assembled to the flow meter, creating a compact flow measurement system.</li> <li>• NEMA 4X (IP 66) enclosure.</li> </ul>		
<p><b>Remote Mount</b></p> <ul style="list-style-type: none"> <li>• Ideal when monitor needs to be located away from flow meter. Suitable for high temperature, excessive noise or inaccessible areas.</li> <li>• NEMA 4X (IP 66) enclosure.</li> <li>• Panel, DIN rail, and pipe mounting hardware included.</li> <li>• Cable lengths from 10...100 ft (3...30.5 m) sold separately.</li> </ul>		
<p><b>Swivel Mount</b></p> <ul style="list-style-type: none"> <li>• Capable of adjustment pivot of 180 degrees for ease of viewing.</li> <li>• NEMA 4X (IP 66) enclosure.</li> <li>• Remote Swivel mount also available, consult factory for details.</li> <li>• Offers additional protection from elements.</li> </ul>		
<p><b>Explosion Proof</b></p> <ul style="list-style-type: none"> <li>• Ideal for hazardous locations.</li> <li>• NEMA 4X (IP 66) enclosure.</li> <li>• Rugged compact design.</li> <li>• Remote or meter mount.</li> </ul>		

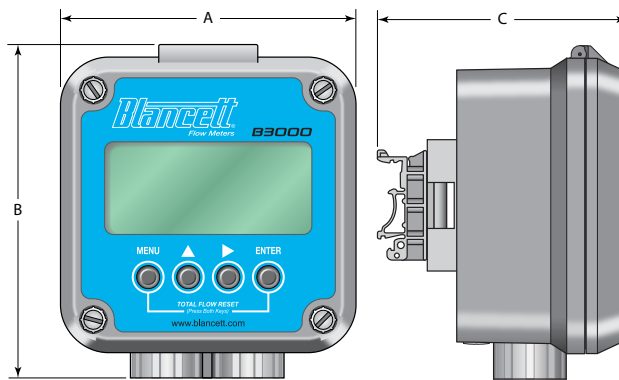
## DIMENSIONS

### Meter Mount



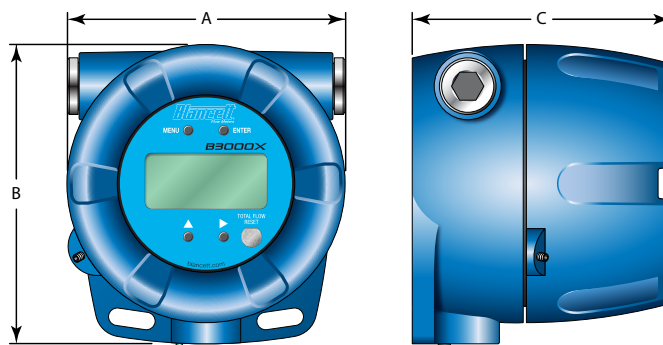
A	B	C
4.50 in. (114.3 mm)	5.08 in. (129.0 mm)	4.78 in. (121.4 mm)

### Remote Mount



A	B	C
4.50 in. (114.3 mm)	5.08 in. (129.0 mm)	3.80 in. (96.5 mm)

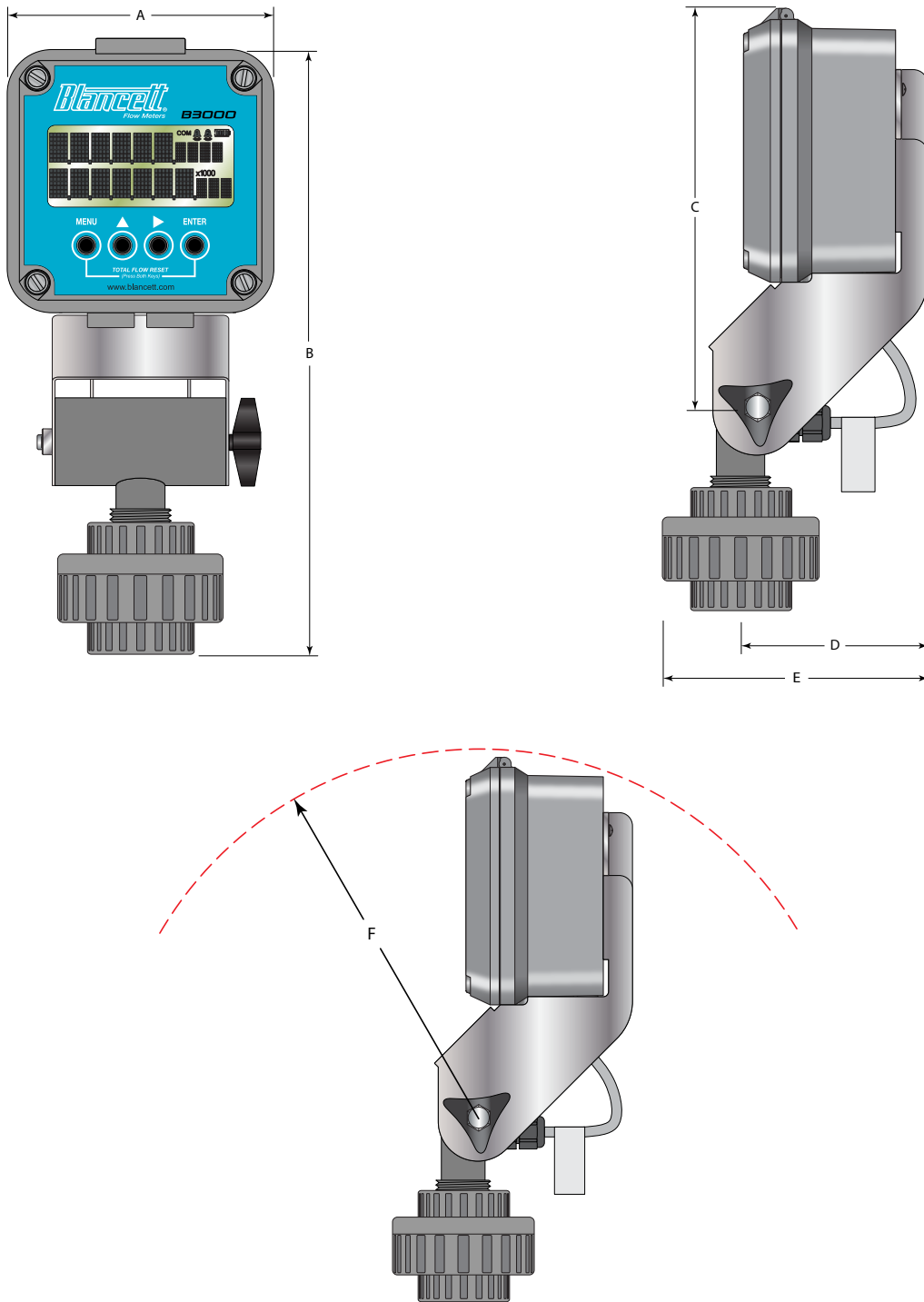
### Explosion Proof



A	B	C
5.25 in. (133.4 mm)	5.65 in. (143.5 mm)	4.86 in. (123.4 mm)



Swivel Mount



A	B	C	D	E	F
4.50 in. (114.3 mm)	10.9 in. (276.9 mm)	6.90 in. (175.4 mm)	3.21 in. (81.5 mm)	4.25 in. (107.9 mm)	7.00 in. (177.8 mm)