

## BiRotor Plus™ Models B271, B274, B281 and B284

### DESCRIPTION

The BiRotor Plus™ meter is a volumetric flow measuring device designed for the accurate measurement of petroleum liquids in a variety of applications. This double case meter combines the rugged durability and long service life of the traditional BiRotor meter with the improved accuracy and pulse output associated with today's most sophisticated devices.

Utilizing single or dual outputs, with two non-wetted pick-offs mounted 90° out of phase, the BiRotor Plus complies with API Level B pulse output standards. Output signals are amplified and shaped by a preamplifier mounted directly on the meter for transmission to accessories such as totalizing counters, digital readout devices, provers and other control equipment and instrumentation.

The inherent balanced rotor design makes the meter resistant to shock loads on the mechanism resulting from the shifting of off-balance masses or the introduction of air slugs.

Typical applications includes loading/unloading, batching, blending and inventory control of petroleum products where accuracy and repeatability are the deciding factors in meter selection. It is recommended for loading and unloading tankers, railcars or trucks, pipelines, aircraft refueling, and general purpose flow measurement.

### DESIGN FEATURES

- Superior performance: Linearity  $\pm 0.10\%$  or better over 10:1 flow range; Repeatability  $\pm 0.01\%$
- Double case construction avoids loss of calibration due to changes in pressure or temperature
- New rotor profile provides high resistance to air slugs and entrained solids
- No metal-to-metal contact
- Dual pulse output meets Level B pulse security described in API manual, Chapter 5.5.4.4.
- Explosion proof amplifier housing
- Single or dual pulse output - non-wetted pickoffs
- Reduced number of parts reduces maintenance requirements.
- Variety of readout instrumentation available
- Horizontal or vertical mounting
- Class I, Division 1, Group C & D, NEMA 4X, UL, cUL and CENELEC Eex d II B T6, CE, NTEP, CRN (Canada) and Industry Canada (Canada)

### PERFORMANCE

Linearity:  $\pm 0.10\%$  or better over 10:1 flow range  
Repeatability:  $\pm 0.01\%$

#### Pick-off Temperature

Standard: -20 to 180°F (-29 to 82°C)  
High Temperature Option: -20 to 325°F (-29 to 163°C)  
Requires extension



### MATERIALS OF CONSTRUCTION

**Housing:** Carbon Steel

#### Measuring Unit

End Plates: Cast Aluminum

Rotors: Cast Aluminum, Hard Anodized

Rotor Shafts: 17-4 ph Stainless Steel

Rotor Bearings: Stainless Steel Ball Bearings

**O-Rings:** Viton Standard (Other elastomers available)

**Option:** Low Level Nitrile (MTBE)

### SPECIFICATIONS - Electrical

Dual channel preamplifier

Single or dual, non-wetted, reluctance pick-offs

#### Preamplifier Performance

Inputs

Supply Voltage: 10 to 30 Vdc

Sensor Type: Reluctance

Type: Sine Wave

Amplitude: 40 mV peak to peak minimum

Outputs

Powered Pulse Output

Type: Square Wave

Frequency Range: 0 to 5 kHz

Amplitude: 0 to 5 V

1 kOhm interval pull-ups, 20 mA max.

Variable Voltage Output

Type: Square Wave

Frequency Range: 0 to 5 kHz.

Amplitude: 0 to Supply Voltage

1 kOhm internal pull-ups, 70 mA max.

Open Collector Output (Per Channel)

Type: Square Wave

Frequency Range: 0 to 5 kHz.

Max. Voltage: 30 Vdc

Max. Current: 125 mA

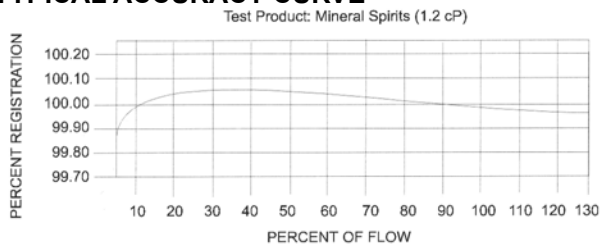
Max. Power: 0.5 watts

Temperature: -20 to 180°F (-29 to 82°C)

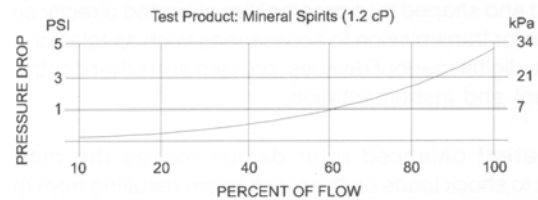
SPECIFICATIONS - METER					Extended Flow Range	
Model Number	Flange Connections	Maximum Safe Working Pressure	Maximum Safe Working Temp. <sup>(1)</sup>	Standard Flow	Minimum <sup>(2)</sup>	Intermittent Maximum <sup>(3)</sup>
B271	3", 150 lb. ANSI DN 80 PN 16	285 psi; 1964 kPa; 16 Bar	-20° to 180° F -29° to 82° C	43 to 425 U.S. gpm 163 to 1609 lpm	30 gpm 114 lpm	550 gpm 2081 lpm
B274	3", 300 lb. ANSI DN 80 PN 40	740 psi; 5099 kPa; 40 Bar	-20° to 180° F -29° to 82° C	36 to 354 Imp.gpm 61 to 607 Bbls/hr.	25 Imp.gpm 43 Bbls/hr	458 Imp.gpm 786 Bbls/hr
B281	4", 150 lb. ANSI DN 100 PN 16	285 psi; 1964 kPa; 16 Bar	-20° to 180° F -29° to 82° C	70 to 700 U.S. gpm 265 to 2650 lpm	50 gpm 189 lpm	900 gpm 3406 lpm
B284	4", 300 lb. ANSI DN 100 PN 40	740 psi; 5099 kPa; 40 Bar	-20° to 180° F -29° to 82° C	58 to 583 Imp.gpm 100 to 1000 Bbls/hr	42 Imp.gpm 71 Bbls/hr	749 Imp.gpm 1286 Bbls/hr

(1) Standard temperature shown. See high temperature option. (2) Linearity 0.15% for conditions between extended minimum flow and standard minimum flow. (3) Intermittent usage equals 5 hours or less in a 24 hour period.

### TYPICAL ACCURACY CURVE



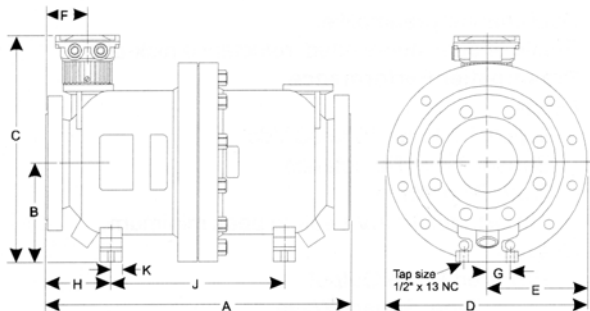
### TYPICAL PRESSURE DROP CURVE



### K-Factor - Nominal

3" Model B271 & B274; 159 pulses/gallon (42 pulses/liter)  
4" Model B281 & B284; 96 pulses/gallon (25 pulses/liter)  
Note: K-Factor will vary for each meter

**DIMENSIONS** - (For Certified Dimension Prints - Consult Factory)



MODEL	SIZE	A	B	C	D	E	F	G	H	J
B271 & B274	3" 150 lb. ANSI	16-3/4" 425mm	6" 152mm	13-7/8" 352mm	11-3/4" 298mm	5-7/8" 149mm	2-11/16" 68mm	1-3/8" 35mm	3-5/8" 92mm	9-19/32" 236mm
	3" 300 lb. ANSI	17-1/8" 435mm	6" 152mm	13-7/8" 352mm	11-3/4" 298mm	5-7/8" 149mm	2-11/16" 68mm	1-3/8" 35mm	3-13/16" 97mm	9-19/32" 236mm
B281 & B284	4" 150 lb ANSI	20" 508mm	6-5/8" 168mm	16" 406mm	13-3/4" 337mm	6-5/8" 168mm	2-3/4" 70mm	1-1/2" 38mm	4-1/4" 108mm	11-1/2" 283mm
	4" 300 lb ANSI	20-5/8" 524mm	6-5/8" 168mm	16" 406mm	13-3/4" 337mm	6-5/8" 168mm	2-3/4" 70mm	1-1/2" 38mm	4-9/16" 116mm	11-1/2" 283mm

### SHIPPING WEIGHT AND VOLUME (APPROX.)

MODEL B271 & B274; 193lb. (88 kg), 9.3 ft<sup>3</sup> (0.27 M<sup>3</sup>)  
Model B281 & B284; 293 lb. (133 kg.), 9.5 ft<sup>3</sup> (0.27 M<sup>3</sup>)

### ACCESSORIES

Daniel Prests and Batchers  
Daniel Tri-10 Electronic Register  
Daniel 788DVC Digital Control Valve and other additional specific valves

The BiRotor Plus is compatible with most electronic monitoring and measurement systems of other manufacturers.

### ORDERING INFORMATION

When ordering, please specify product to be metered, product viscosity, product temperature range, rate of flow, operating pressure and accessories.

# DANIEL<sup>®</sup>

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