

# Model 1100 Turbine Flow Meters

## For Water and Water-based Fluids

### Features

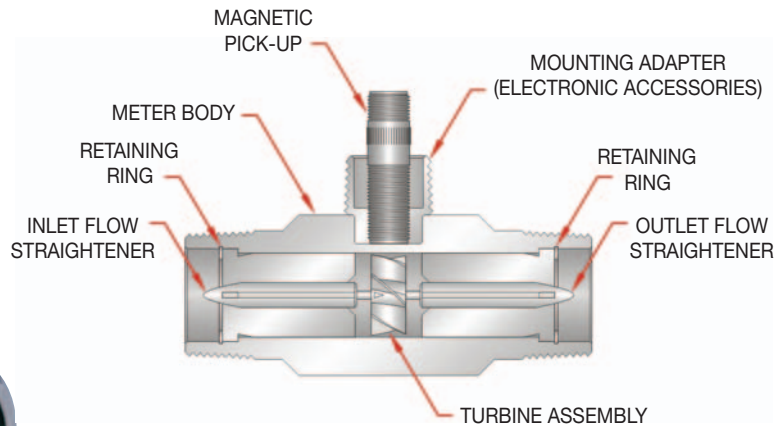
- Flow ranges from 0.6 to 5,000 GPM
- Rugged 316 stainless steel construction
- Meter bore sizes from 3/8" to 10"
- NPT, BSP, Victaulic®, or flange end connections from 1/2" to 10"
- Accuracy of  $\pm 1\%$  of reading
- Electronic integration available with HB2800 Flow Monitor, F to I/F to V Intelligent Converter or the K-Factor Scaler
- NIST traceable calibration available

The Model 1100 Turbine Flow Meter is designed to withstand the demands of the most rigorous flow measurement applications. The meter features a rugged 316 stainless steel housing and rotor support assembly, CD4MCU stainless steel rotor, and abrasion-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 a variety of industrial applications.

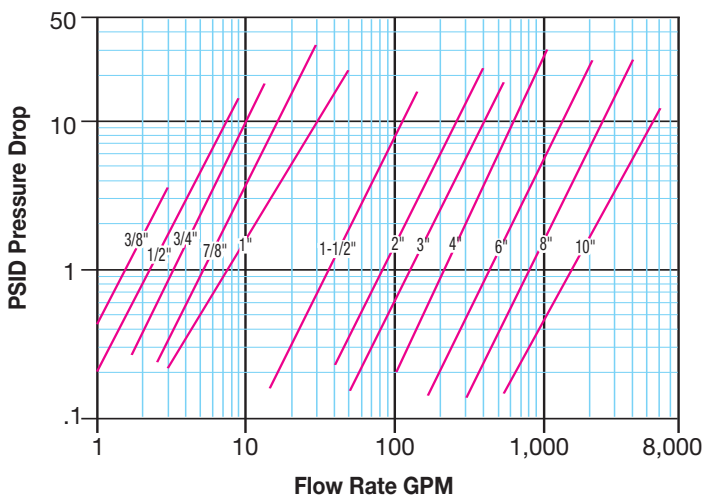
The Model 1100 is standard with a magnetic pick-up which produces a frequency output that is proportional to its volumetric flow rate. When paired with the HB2800 Flow Monitor, this compact system offers local indication of both flow rate and total flow. For further flexibility, Hedland offers electronic options which convert the frequency output to an analog signal for easy electronic integration with most instruments, PLCs, and computers.

### 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 pick-up coil. These pulses produce an output frequency proportional to the volumetric flow through the meter.



Pressure Drop vs. Flow Rate



### Specifications

#### Materials of Construction:

Body	316 Stainless steel
Rotor	CD4MCU Stainless steel
Rotor Support	316 Stainless steel
Rotor Shaft	Tungsten carbide

**Turndown Ratio:** 10:1

**Accuracy:**  $\pm 1\%$  of reading

**Repeatability:**  $\pm 0.1\%$

**Calibration:** Water (NIST traceable calibration)

**Pressure Rating:** 5,000 psi (345 bar) maximum

**Temperature:** -150 °F to +350 °F (-101 °C to +177 °C)

**End Connections:** NPT, BSP, Victaulic®, flange

**Magnetic Pick-up:** 30 mV to 3 V (peak-to-peak)

-150 °F to +330 °F (-101 °C to +165 °C)

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### Ordering Information

Model No. <sup>1</sup>	Bore Size	End Connection <sup>2</sup>	Max PSI	Flow Ranges		Recommended Strainer Mesh	Approx K-factor Pulses/Gal	Meter Weight Lbs	End to End Length
				GPM	LPM				
HB110-375	3/8"	1/2" Male NPT	5,000	0.6 - 3	2.27 - 11.36	60	18,000	1	3"
HB110-500	1/2"	1/2" Male NPT	5,000	0.75 - 7.5	2.84 - 28.39	60	13,000	1	3"
HB110-750	3/4"	1/2" Male NPT	5,000	2 - 15	7.57 - 56.78	60	3,300	1	3"
HB110-875	7/8"	1" Male NPT	5,000	3 - 30	11.36 - 113.6	60	3,100	2	4"
HB111-110	1"	1" Male NPT	5,000	5 - 50	18.93 - 189.3	40	870	2	4"
HB111-115	1-1/2"	1-1/2" Male NPT	5,000	15 - 180	56.78 - 681.4	20	330	5	6"
HB111-121	1-1/2"	2" Male NPT	5,000	15 - 180	56.78 - 681.4	20	330	6	6"
HB111-120	2"	2" Female NPT	5,000	40 - 400	151.4 - 1514	20	52	14	10"
HB111-130	3"	3" Grooved End	800	60 - 600	227.1 - 2271	10	57	15	12-1/2"
HB111-140	4"	4" Grooved End	800	100 - 1,200	378.5 - 4542	10	29	20	12"
HB111-160	6"	6" Grooved End	800	200 - 2,500	757 - 9464	4	7	46	12"
HB111-180	8"	8" Grooved End	800	250 - 3,500	946 - 13249	4	3	56	12"
HB111-200	10"	10" Grooved End	800	500 - 5,000	1893 - 18927	4	1.6	80	12"

<sup>1</sup>Part number includes turbine meter and standard magnetic pick-up. For other pick-up options, see table below.

<sup>2</sup>Consult factory for BSP or flange end connections.

Optional Magnetic Pick-up	Temperature Range	Model No.	Add Suffix
High Temperature	-150 °F to +450 °F	HB220111	-HT
With Pre-Amplifier	-20 °F to +160 °F	HB220210	-PA
Active Pick-up with 4-20 mA	-22 °F to +158 °F	HB220-950 <sup>1</sup>	-420
Active Pick-up with 0-5 VDC	-22 °F to +158 °F	HB220-951 <sup>1</sup>	-05V

<sup>1</sup> For complete specifications, see page 6.

### Ordering Examples

HB110-750	3/4" x 1/2" Male NPT with Standard Magnetic Pick-up
HB110-750-HT	3/4" x 1/2" Male NPT with High Temp Pick-up
HB110-750-420	3/4" x 1/2" Male NPT with 4-20 mA Active Pick-up

### Installation

The Model 1100 Turbine Meter is simple to install and service. It operates in any orientation (horizontal to vertical) as long as the "flow direction" arrow is aligned in the same direction as the actual line flow. For optimum performance, the flow meter should be installed with a minimum of 10 diameters upstream straight pipe length and 5 diameters downstream straight pipe length.

### 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 retard the rotational movement of the turbine rotor. These frictional forces include: magnetic drag, created by electromagnetic force of pick-up transducers; mechanical drag, due to bearing friction; and viscous drag, produced by flowing fluid. See charts at right.

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.

### Typical K-Factor Curve (Pulses per Gallon)

