North American Turbine Flowmeter For Gas Service

FEATURES

— Outstanding accuracy
— High turndown
— Shielded, self-lubricating ball bearings
— 150# raised face steel flanges or male NPT ends
— Magnetic or modulated carrier pickup
— A variety of display and electrical output options

Turbine type flowmeters have long been recognized as the economical choice when high accuracy and reliable operation are required in gas flow measurement applications. Fives turbine flowmeters are available with a wide variety of electronic signal conditioning and indicators. Fives can provide standard and custom engineered packages for transmitting and displaying flow rate and totalized fuel consumption.

The bearings, key to reliable operation and long life, are 440C stainless steel rolling in a high grade polymer raceway. The design of these bearings was developed within NASA for cryogenic use and has proven to be excellent for natural gas service as well.

SPECIFICATIONS

- Materials of construction: 304 stainless steel
- Bearing material: 440C stainless steel, polymer low friction raceways
- End fittings: Flanged or NPT
- Rotor: Hydraulically balanced, 304 stainless steel
- Flow straightener: Upstream and downstream
- Linearity: ±1.0% over full range
- Repeatability: ±0.25%
- Turndown: 10-25:1, depending on options and operating conditions
- Overrange: 150% of maximum flow intermittently
- Fluid temperature range: +450° to –450°F
- Display, operating temperature range: –22° to +167°F
- Max. Static Pressure: Flanged: 240 psig MNPT: 1000 psig
- Power supply: 5-48 V dc, 4-20 mA loop power, or internal battery (D Lithium, approx. 4 year life without output)

The stainless steel construction of the meter assures years of corrosion-free operation. The meter is available with either NPT or flanged ends to mate appropriately to any piping system.

Two methods of signal pickup are offered. Magnetic is less expensive and suitable for turndown requirements of 10:1 for small meters and up to 16:1 for larger ones. Modulated carrier pickup is useful if greater turndowns are needed. Refer to the Meter Sizing Table on page 2 for details.

Explosion proof signal conditioners and display units are standard. If needed, the add-on 8123D Flow Rate Indicator and Totalizer is rated NEMA 4X for the surface mounted unit.
FLOWMETER SIZE CALCULATION*

1. Calculate the maximum actual cfm flow rate (acfh) required. Note that this converts from standard flow per hour to actual flow per hour. This number will be used to enter the chart below.

\[
\text{acfh} = \frac{\text{scfh} \times 14.7 \times (T_f + 460)}{(P_g + 14.7) \times 530}
\]

where \( \text{scfh} = \) your desired flow maximum in scfh
\( P_g = \) operating pressure in psig, and
\( T_f = \) operating temperature, Fahrenheit.

2. Repeat the calculation for the minimum needed flow.
3. Look in the Meter Sizing Table below for the meter size that most closely matches the needs.
4. Next check the Gross Pressure Drop Chart to determine the expected maximum drop across the meter in osi differential.
   Note that the horizontal axis is in acfm, not acfh. Actual cfm is shown at each major flow level for reference.

METER SIZING TABLE*

<table>
<thead>
<tr>
<th>Meter size, inches</th>
<th>Flow range, acfh (Magnetic Pickup)</th>
<th>Extended flow range, acfh (MC Pickup with Amplifier)</th>
<th>Approx. Meter Wt.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>min. linear</td>
<td>max. linear</td>
<td>min. linear</td>
</tr>
<tr>
<td>¾</td>
<td>150</td>
<td>1680</td>
<td>90</td>
</tr>
<tr>
<td>1</td>
<td>240</td>
<td>3600</td>
<td>120</td>
</tr>
<tr>
<td>1½</td>
<td>360</td>
<td>6000</td>
<td>180</td>
</tr>
<tr>
<td>2</td>
<td>480</td>
<td>7800</td>
<td>300</td>
</tr>
<tr>
<td>2½</td>
<td>900</td>
<td>15000</td>
<td>660</td>
</tr>
<tr>
<td>3</td>
<td>2400</td>
<td>39000</td>
<td>—</td>
</tr>
</tbody>
</table>

GROSS PRESSURE DROP CHARACTERISTICS*

* Table and chart pertain to natural gas only. (0.0459 #/ft³ density)
INSTALLATION DIMENSIONS (inches)

Plug mates with two pin connector

A.S.A. flat face raised face ring 150#

Plug mates with two pin connector

Meter size is based on nominal inside diameter pipe.

<table>
<thead>
<tr>
<th>Line Size</th>
<th>150# ASA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>¾</td>
<td>5½</td>
</tr>
<tr>
<td>1</td>
<td>5½</td>
</tr>
<tr>
<td>1¼</td>
<td>6</td>
</tr>
<tr>
<td>1½</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>6½</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
</tr>
</tbody>
</table>

TYPICAL FLOWMETER SYSTEM INSTALLATION

Plug mates with two pin connector

Pickup coil

Flowmeter

Block Valve

Filter/Strainer

Bypass Valve

5 pipe diameters downstream

20 pipe diameters upstream minimum

NPT threads (ANSI B1.20.1)
The format of the part number is

8123- - /

Electronic option with magnetic pickup

IT400 = analog (4-20 mA) or pulse output, rate and resettable totalizer display, NEMA 4, NEMA 7 for Class 1, Div. 1, Groups B, C, and D

AO = analog (4-20 mA) output, no display, NEMA 7 for Class 1, Div. 1, Groups B, C, and D

FO = pulse output, no display, NEMA 7 for Class 1, Div. 1, Groups B, C, and D (see note 1)

Electronic option with modulated carrier pickup (see note 2)

AO = analog (4-20 mA) output, no display, NEMA 7 for Class 1, Div. 1, Groups B, C, and D

FO = pulse output, no display, NEMA 7 for Class 1, Div. 1, Groups B, C, and D (see note 1)

Note 1: Select this option for use with 8123D Flow Rate Indicator and Totalizer (resettable and non-resettable totals). This instrument is not rated NEMA 7. It is NEMA 4X in surface mount and has a NEMA 4 front for panel mounting.

Note 2: The only display option with modulated carrier is 8123D.

Examples: 8123-4-CM/IT400 - 2" meter with flanged ends, magnetic pickup and analog or pulse output with rate and totalizer display.

8123-4-AC/FO - 2" meter with NPT ends, modulated carrier pickup, pulse output.

Order 8123D separately for display option

Optional power supply: Order R650-2504 (24 V dc power supply unit).