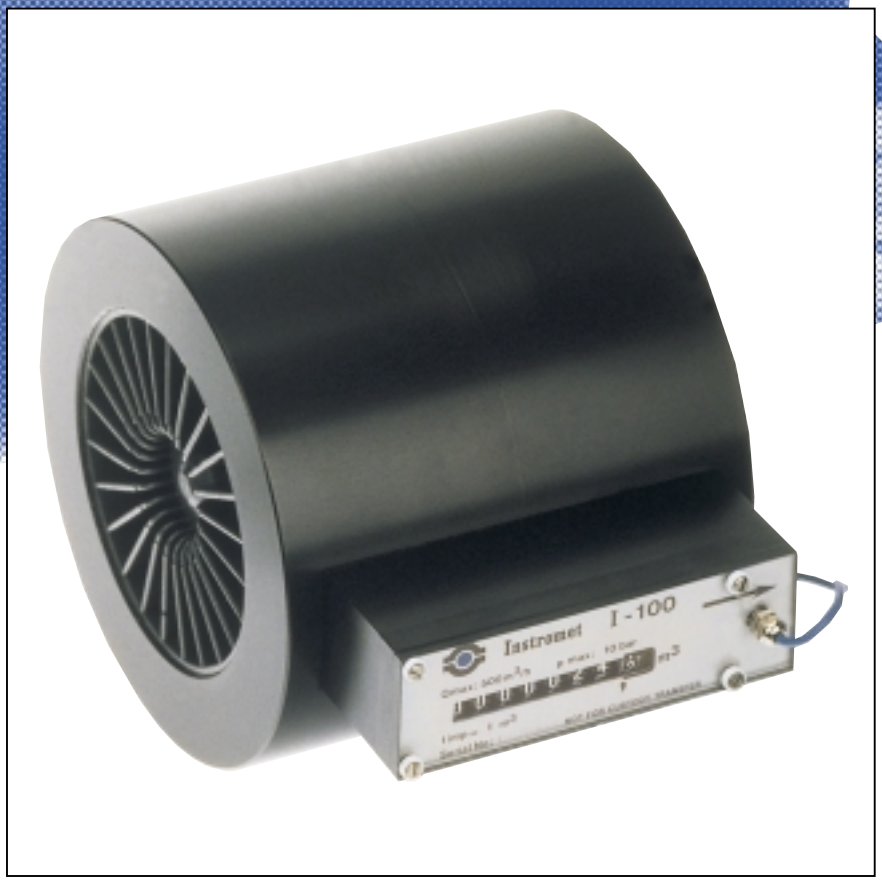
Instromet®

This product is discontinued!

TURBINE GAS METER TYPE "I"



ENERGY COST ALLOCATION

Do you know which of your processes accounts for what percentage of your gas consumption ? Can you effectively measure the efficiencies of your processes ?

The INSTROMET "I" meter has been specifically developed as an economic means to allocate your gas consumption and give you the tools to increase your efficiency.

It has been specifically designed for easy installation and requires only minimal maintenance under normal conditions.

A simple reliable mechanical counter registers total volume and a pulse output is available for on line monitoring.

Every meter module is calibrated individually against traceable standards. It features high accuracy and repeatability.

Of course, to compensate for pressure and / or temperature the "I" meter can also be combined with any of the range of INSTROMET volume correctors, from the economic model 333 series to the sophisticated 999, which incorporates a wealth of data logging facilities.

MATERIAL SPECIFICATION

Table 2.

ITEM	MATERIAL
Rotor	Delrin*
Body	Anodised aluminum
Shafts	Stainless steel
Gearing	Delrin*
Mean bearings	Stainless steel ball (Lubricated for life)
Bearing bushes	Delrin*
O-rings	Viton*
Index housing	Anodised aluminum
Index glass	Clear plastic
Index gears	Delrin*
Cable length	1 meter
Cable diameter	3.3 mm
Cable gland	Brass. Chrome plated IP68 (DIN 40050)
LF output	Reed switch max. 10 watt 500 mA
Magnetic drive	Ferroxdure magnets

*Registered names of DuPont

APPLICATIONS

The standard "I" meter is suitable for all non-corrosive gases such as natural gas, propane, butane, air, nitrogen, hydrogen, etc. All gases should be clean and dry.

MEASURING RANGE

A turbine meter's operating range increases with the density of the flowing gas. The following formula may be used to calculate the approximate meter turndown for different gases at various operating pressures.

$$Q = \frac{Q_{max}}{10} \sqrt{\frac{P_{atm}}{P_o}} \times \frac{1}{d}$$

Where

Q = minimum capacity at operating conditions.

Q_{max} = maximum capacity (table 1).

P_o = absolute operating pressure of meter in bara.

P_{atm} = atmospheric pressure (1.01325 bara).

d = relative density of flowing gas (Air = 1).

TECHNICAL DATA

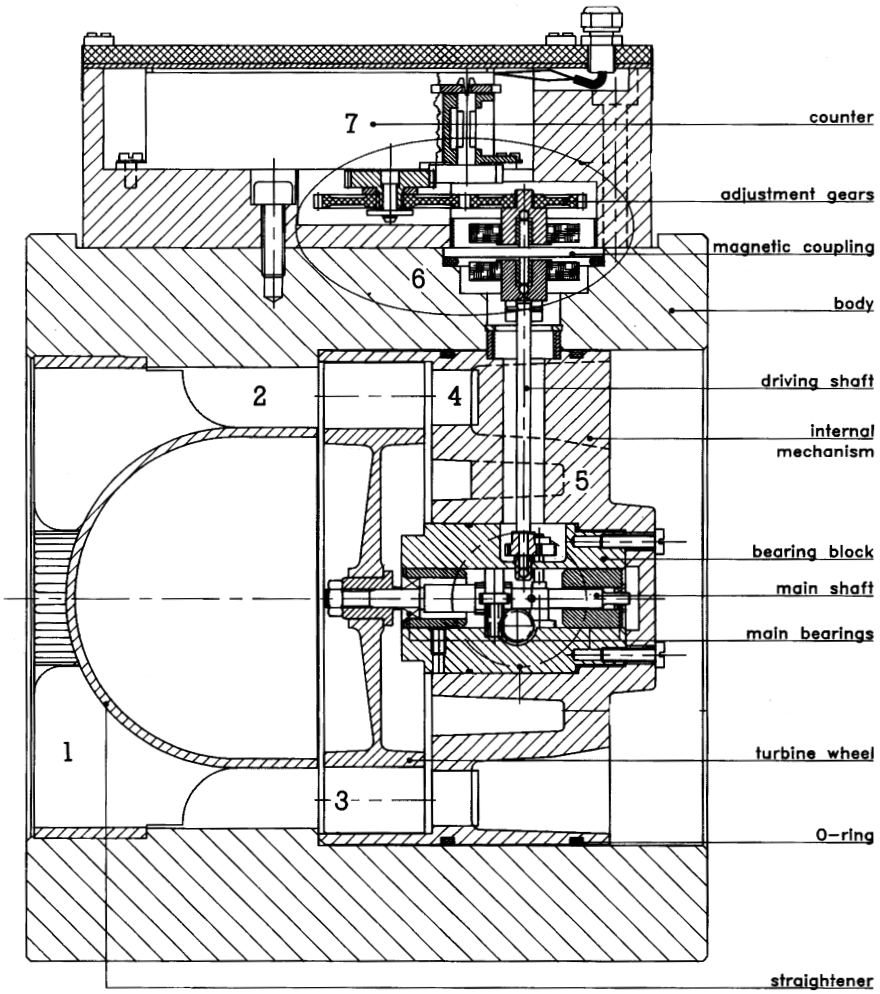
Table 1.

Meter designation	1-50	1-80	1-100
Bore size	50mm (2")	80mm (3")	100mm (4")
Max. flow rate (m^3/h)	100	250	500
Max flow rate (ft^3/h)	3500	8800	18000
Operating range (atm.air)*	1:10	1:10	1:10
Meter Error Q_{min} to Q_{max}	+2 % / -3 %		
Pressure loss at Q_{max} (atm.air) in mbar	16 (0.23 psi)	10 (0.15 psi)	16 (0.23 psi)
Operating pressure (bar)		10 (145 psi)	
Test pressure (bar)		16 (232 psi)	
Operating temperature	-10 to +50°C (14°F - 120°F)		
Pulse rate (pulses/m^3)	10	1	1
Pulse rate (pulses/ft^3)	1	0.1	0.1
Weight (kg)	3 (7lb.)	4 (9 lb.)	6 (13 lb.)

*See measuring Range Calculations.

OPERATING PRINCIPLES

The flowing gas enters the meter through a built-in flow conditioner **(1)** that conditions the flow profile and increases the gas velocity. The gas continues along the flow channel **(2)** and enters the turbine rotor. The turbine rotor blading **(3)** is designed with overlap to give complete guidance to the flowing gas and extract the maximum energy at low gas velocities. The turbine wheel's angular velocity is proportional to the average gas velocity flowing through the meter. The gas exits the turbine rotor through a flow ring **(4)** and an expanding exit channel to minimise pressure losses. The rotation of the turbine rotor is transmitted via a gear train **(5)** and transferred from the pressurised meter body to the counter **(7)** by a gas tight magnetic coupling **(6)**. The follower magnet of the magnetic coupling drives the counter to register volumes metered at the operating conditions in either cubic meters or cubic feet.



PRESSURE DROP

The pressure drop listed in table 1 is for air at Q_{max}. The differential pressure for other gases at different pressures and flow rates can be approximated with the following formula:

$$\triangle P_2 = \triangle P_1 \times d \times \frac{P_o}{P_{atm}} \times \left(\frac{Q_{act}}{Q_{max}} \right)^2 \quad [mbar]$$

where $\triangle P_2$ = pressure drop under operating conditions (mbar).
$\triangle P_1$ = pressure drop at Q_{max} on air (mbar) as in table 1.
Q_{act} = actual flow rate (m^3/h).
Q_{max} = maximum flow rate of meter (m^3/h).
d = relative density of flowing gas (air = 1).
P_o = absolute operating pressure in bara.
P_{atm} = atmospheric pressure (1.01325 bara).

LOW FREQUENCY OUTPUT

A reed switch supplying a pulsed signal for a fixed unit of gas passed (see table 1) is supplied as standard.

METER DIMENSIONS

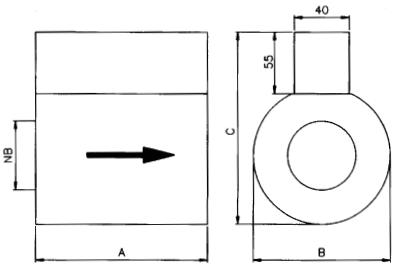


Table 3 [mm].

	NB	A	B	C
1-50	50	125	100	145
1-80	80	125	130	181
1-100	100	150	160	207

INSTALLATION INSTRUCTIONS

1. The gas must be clean and dry. Where this cannot be guaranteed suitable filters should be installed to protect the meter from damage.

2. The gas flow should be free from pulsation. Devices which create high degrees of disturbance (butterfly valves, regulators, or filters etc.) should be installed a minimum of 7 D upstream of the meter.

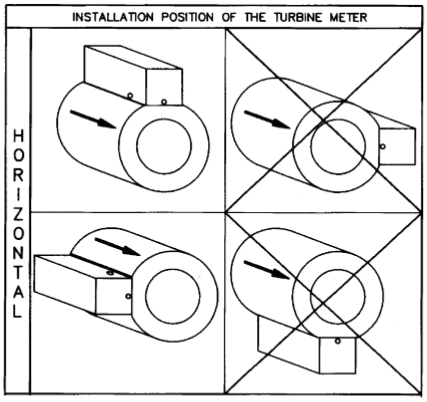
3. Type “I” meters should be installed as shown in table 4. Vertical or non-horizontal installation is possible but precautions should be taken in respect to liquids in the gas.

4. The "I" meter may be overloaded by 20% for short periods of time (20 minutes). During commissioning the meter should be pressurised and into operation slowly.

5. The "I" meter is suitable for both indoor and outdoor installation. However, efforts should be made outdoors to protect the meter from direct weather influences.

INSTALLATION POSITIONS

Table 4.



MAINTENANCE

As the "I" meter uses pre-lubricated sealed-for-life bearings, no maintenance is required beyond visual inspections that the counter drums rotate smoothly, that the index seal tape is secure and that the ventilation holes are clear.

HOW TO ORDER

In order to supply the best meter for your application please provide the following information:

1. Installation line size or required minimum and maximum capacity.
2. Required read-out units of volume, m^3 of ft^3.

INSTROMET has agents and representatives worldwide.

YOUR SALES OFFICE OR REPRESENTATIVE:

INSTROMET has a continuing program of product research and development. Technical specifications and construction may change due to improvements. This publication serves as general information only, and all specifications are subject to confirmation by INSTROMET.

For your nearest sales office or representative please contact:
INSTROMET INTERNATIONAL
Rijkmakerlaan 9 - B-2910 ESSEN - BELGIUM
Tel: +32 3 6700 700 - Fax: +32 3 667 6940
E-mail: sales@instromet.be
Web-page: http://www.instromet.com

Instromet®

Gas measurement and control equipment