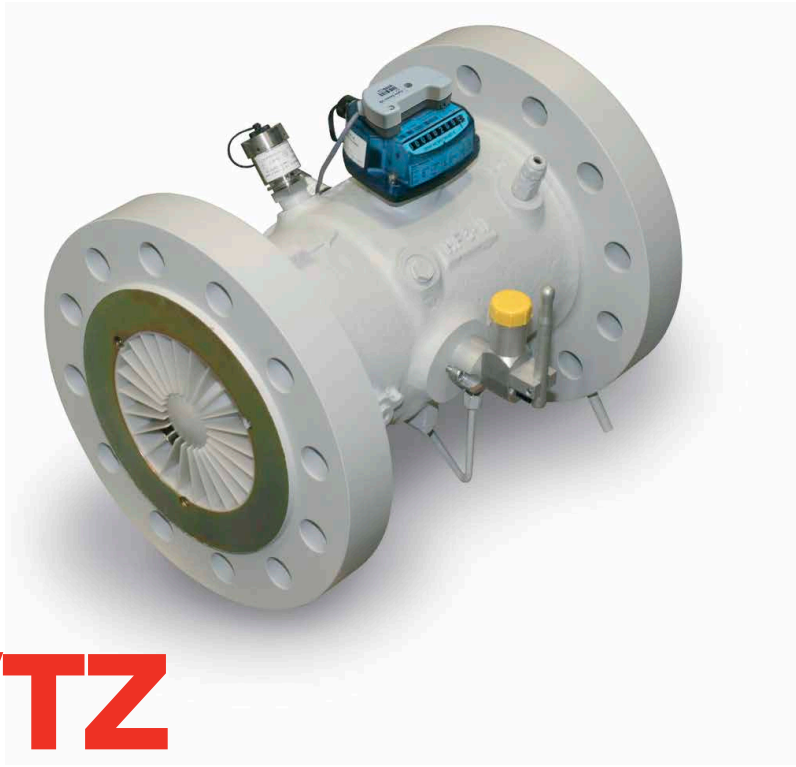


Fluxi 2000/TZ

C&I Gas Meters

The Itron Fluxi 2000/TZ commercial and industrial meters comprise a range of turbine gas measurement devices with capacities of 100 to 10000 m³/h.

The use proven, time-tested design of these meters provide accurate measurement across their respective flow ranges, even with severely perturbed flow velocities. Long-life and low maintenance are assured by the combination of high-quality ball bearings and efficient lubrication.

Turbine gas meters are based on a flow velocity measurement principle. The fluid flow through the meter makes the rotor with multiple blades, mounted on a free-running bearing system, to rotate on its axis. The angular velocity to the turbine rotor is directly proportional to the fluid's linear velocity through the meter housing. The rotor shaft in turn, using a set of internal gears, drives a transmission shaft linked to a magnetic coupling; the latter transfers the mechanical motion of the turning rotor from the pressurized to the non-pressurized area.

A gear train converts the mechanical motion into revolutions of display drums and pulsing devices into the totalizer. Within the gear train, timing gears – or change gears- allow the turbine error of indication to be shifted in a linear fashion.

DESCRIPTION

1. Straightener :

   The nose cone and fins straighten or « condition » the flowing gas; the smaller circular channel also increases the velocity of the gas, thus magnifying its kinetic energy.

2. Rotor :

   A precision-machined 45° bladed wheel; 60° bladed wheel accommodates extended flow velocities.

3. Measuring unit :

   High-quality, stress-free mounted ball bearings are encapsulated in chamber designed to limit dust ingress.

4. Magnetic coupling :

   Pressure resistant and optionally high-temperature resistant.

5. Totalizer :

   Freely rotating, weather tight for an easy reading even in severe environmental conditions.

6. High-frequency pulse generator :

   An easily retrofittable sensor to pick-up rotor shaft and/or wheel blade rotation.

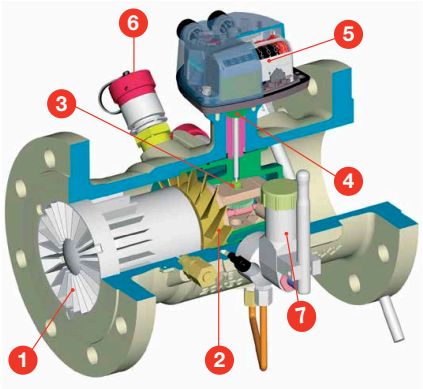
7. Oil pump and reservoir :

   Flushes fresh oil into the pressurized rotor ball bearing.

APPLICATIONS

Fluxi 2000/TZ meters are designed to measure natural gas, and various filtered, and non-corrosive gases. They are used to measure medium to high gas flow, at low, medium or high pressure.

The Fluxi 2000/TZ meters have been optimised for use in all applications related to the transportation and distribution of gas. Fluxi 2000/TZ meters are approved for fiscal use.



SPECIFICATIONS

KEY FEATURES

- Compliant with all current European and International Standards
- Excellent high-pressure accuracy
- Accommodates even compact installations with severe flow perturbations
- Reduced pressure loss for low pressure network
- IP 67 protection of the totaliser for outdoors installations
- Equipped as standard with the Cyble target.
- AMR/AMI compatible

Universal totaliser fitted as standard with the Cyble target

Cyble module

UNIVERSAL TOTALIZER

Itron Universal Totalizer is a mechanical index designed for outdoors installations. Thanks to its built-in "target", it can receive a sealable module from the Cyble series.

- Protection class IP67
- 9-digit index to register larger volumes
- Free-rotating totaliser
- 45° orientation for easy reading
- Desiccant cartridge included
- Integrated disc for optical rotation sensor
- Display Unit: m^3

Option :

- Additional removable desiccant cartridge, for high condensation environment
- Meter head extension, that keeps the index out of the ice, packing the meter downstream to non pre-heated pressure reduction stations
- Output drive shaft, to drive mechanical instruments, designed in accordance with EN 12261
- Fire-proof (HTB) execution

Cyble modules :

The Cyble modules can be easily attached and sealed to the on Universal Totalizer. They are powered with a long-life lithium battery, generate safe and reliable volume pulses or replicate meter index, and monitor attempts of manipulation.

They ease the communication of Fluxi 2000/TZ meters with other devices or the integration into communication networks:

- Wired communication modules with M-Bus, L-Bus or Namur communication protocol
- Wireless communication modules for superior reading distance

PULSE GENERATORS

Low frequency

- Itron Universal Totalizer provides two low-frequency (LF) pulse generators and one anti-tampering (AT) alarm. The low-frequency pulses are generated by Reed switches actuated by magnets rotating with index drums. Pulse weight is indicated in the Metrological data table.
- Optionally the Universal Totalizer provides a medium-frequency (MF) pulse generator. The medium-frequency pulses are generated by a inductive sensor and a toothed disc mounted on the magnetic coupling. Pulse weight is indicated in the Metrological data table.

Itron Universal Totalizer is fitted with one or two Binder IP67 male sockets.

High frequency

High-frequency pulse generators provide a higher resolution signal, for process control purposes or fast accuracy checks.

Fluxi 2000/TZ meters offer two types of sensors, each one with the possibility of being doubled-up for signal redundancy and inter-comparison purposes : the HF2 sensor detects the rotation of a toothed disc on turbine wheel shaft, while the HF3 sensor detect the blades of the turbine wheel. The latter can be used to monitor the integrity of the turbine rotor. Pulse weights are indicated in the next table.

HF2 and HF3 sensors are fitted with Binder IP 67 connectors.

SPECIFICATIONS

Maximum Flow Rate	5 m^3/h to 10,000 m^3/h
Accuracy Class	1.0
Rangeability	1:20, 1:30
Nominal Diameters	DN 50 to DN 400
Maximum operating pressure	Up to 100 bar
Pressure Rating	PN 10, 16, 25, 40, 50, 100 Class 150, 300, 600
Metrologic Temperature Range	-25°C to +55°C
Storage Temperature Range	-40°C to +70°C
Length	3 DN
Body Material	Ductile iron, low carbon steel
Mechanical environment	Class M1
Electromagnetic environment	Class E2
Mounting position	Horizontal, Vertical
Conformity	2014/32/EU Measuring Instruments (MID) 2014/68/EU Pressure Equipment Directive (PED) 2014/34/EU Potentially explosive atmospheres (ATEX) 2014/30/EU Electromagnetic Compatibility (EMC) EN 12261 "Gas meters — Turbine gas meters"

LUBRICATION

Fluxi 2000/TZ meters are extremely durable. Long-life ball bearings, protected against soiling by polluted gas, assure friction less rotation of the meter rotor. For application in severe conditions, an oil pump with reservoir can be supplied as an option. The oil pump allows regular flushing of the dirty oil out of the ball bearings on meters under pressure.

PRESSURE LOSS

The pressure loss of Fluxi 2000/TZ meters is indicated in the Metrological Data table for a reference densities natural gas. It can be estimated for a gas of other density by using the following formula :

Calculation of pressure loss:

$$\Delta p = \Delta p_r \times \frac{\rho n}{0.83} \times (Pb+1) \times \left[\frac{q}{Qmax}\right]^2 \times \left[\frac{273}{(273+Tb)}\right]$$

where:

- Δp: Pressure loss in the calculated conditions
- Δpr: Pressure loss in the reference conditions
- ρn: Gas density (kg/m³) at 0° C and 1013 mbar
- Pb: Operating pressure (Bar gauge)
- q: Flow rate (m³/h)
- Qmax: Maximum flow rate (m³/h)
- Tb: Gas temperature (°C).

PRESSURE AND TEMPERATURE TAPPINGS

Fluxi 2000/TZ meters are equipped with pressure and temperature tappings designed in accordance to EN 12261. They allow to measure the pressure and the temperature of the gas passing through the meter. Optionally dual pressure or temperature tappings can be provided.

Pressure tappings are fitted with Ermeto couplings.

Temperature tappings can accommodate various types of thermowells suitable for a Ø 6 mm temperature sensor. Thermowells can be factory installed or added later with limited influence on the metrology of the meter; no re-calibration is therefore needed.

INSTALLATION

Fluxi 2000/TZ meters can be installed a horizontal or vertical position (≤DN300).

The design of their inlet straightener makes them especially insensitive to flow velocity perturbations and allows installation in very compact stations: an upstream straight pipe length of 2 DN is enough to ensure that EN 12261 requirements are met in case of low level perturbation caused by piping elements such as bends, tees, convergent and divergent sections or even of high level perturbation caused by regulators or other throttling devices. No straight pipe is require downstream to the meter.

Optionally Fluxi 2000/TZ meters DN 200 to 400 can be delivered with a lighter flow straightener to reduce the pressure loss in case low level perturbation only is expected from the meter adjacent piping system.

Fluxi 2000/TZ meters can be installed in explosive atmosphere zone 1. See the Instruction Manual for the details of the electrical connection.

Pre-assembly kits including brackets and 3-way valve are available for the Itron pressure and temperature converters used in conjunction with Fluxi 2000/TZ meters.

ACCURACY

Fluxi 2000/TZ meters proven design and construction, based on high-precision parts and high-quality ball bearings offers an optimal mix of high accuracy, large measuring range and resistance to high pressure and flow loads.

Fluxi 2000/TZ meters are calibrated individually. Error of indication meet the requirements of MID and EN 12261 accuracy class 1.0 :

- Maximum permissible error (MPE): +/-1% from Qmax to Qt, +/-2 % from Qt to Qmin
- Weighted Measured Error ME (WME) less than 0.4%.
- Upon request Fluxi 2000/TZ meters can be calibrated within narrower MPE

Rangeability

The ratio of minimum to maximum flow rates for which the meter performs within the maximum permissible errors is 1:20 or 1:30 at low pressure: see table Metrological Data for details.

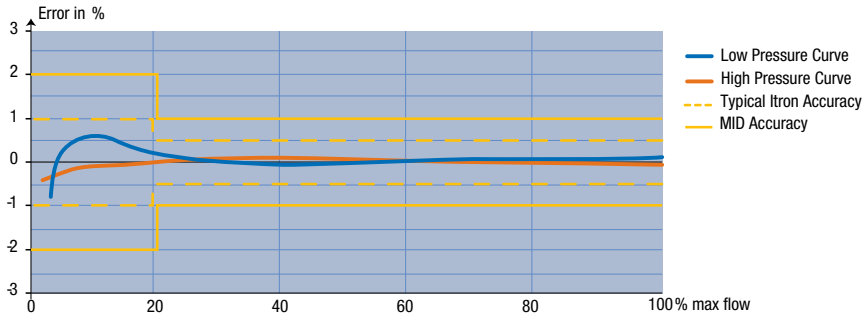
At higher pressures this ratio increases as a result of the higher kinetic energy of the flow.

Metrological pressure range

When calibrated at atmospheric pressure, the metrological pressure range of Fluxi 2000/TZ meters over which they perform within MID or EN 12261 requirements extends up to 5 bar (absolute pressure).

The metrological pressure range can be extended to higher pressures provided the meter is calibrated to one or two higher pressures.

Contact Itron for more details.



METROLOGICAL DATA

G size	DN (mm)	Qmax (m^3/h)	Qmin 1:20 (m^3/h)	Qmin 1:30 (m^3/h)	LF (m^3/Imp)	MF * (Imp/m^3)	HF2* (Imp/m^3)	HF3 * (Imp/m^3)	Pressure loss Δpr (mbar)
G65	50	100	5		0,1	169,643	-	103115	9,1
G100	80	160	8		1	43,3333	13169,8	26339,6	2,4
G160		250	12,5	8		43,3333	13169,8	26339,6	5,9
G250		400	20	13		25,5682	7770,63	15541,26	13
G160	100	250	12,5		1	43,3333	15946,7	15946,7	2,2
G250		400	20	13		43,3333	15946,7	15946,7	5,4
G400		650	32	20		25,5682	9409,09	9409,09	12
G400	150	650	32		1	43,3333	6500,00	6500,00	2,7
G650		1000	50	32		43,3333	6500,00	6500,00	6,6
G1000		1600	80	20		25,5682	3835,23	3835,23	14
G650	200	1000	50		10	4,33333	2655,25	2655,25	2,6
G1000		1600	80	50		4,33333	2655,25	2655,25	6,3
G1600		2500	125	80		2,55682	1566,69	1566,69	14
G1000	250	1600	80		10	4,33333	1728,00	1728,00	3,3
G1600		2500	125	80		4,33333	1728,00	1728,00	8,0
G2500		4000	200	125		2,55682	1019,58	1019,58	17,3
G1600	300	2500	125		10	4,33333	1166,00	1166,00	3,2
G2500		4000	200	130		4,33333	1166,00	1166,00	7,8
G4000		6500	320	200		2,55682	650,455	650,455	17
G2500	400	4000	200		10	4,33333	488,583	488,583	2,8
G4000		6500	320	200		4,33333	488,583	488,583	6,8
G6500		10000	500	320		2,55682	272,557	272,557	15

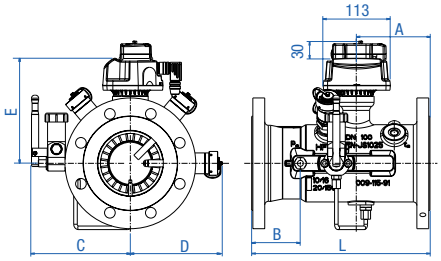
* Small deviations are possible. Actual values after calibration are marked on meter or pulse generator plate.

Fluxi 2000/TZ with PTZ CORUS

DIMENSIONS AND WEIGHT

DN	L mm	A mm	B mm	C mm	D mm	E mm	PN 10/16, Class 150 kg	PN 25/40, Class 300 kg	Class 600 kg
50	150	57	45	137	124	179	8	11	11
80	240	96	60	150	185	175	19	30	37
100	300	124	82	167	150	194	22	45	55
150	450 335*	185 92	122 100	195 195	183 183	185 222	54 46	80	95
200	600	240	175	223	211	223	83	130	150
250	750	275	273	250	234	252	120	220	245
300	900	360	300	277	264	280	190	265	295
400	1200	450	540	328	323	331	440	680	740

* Short version



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