

# Fluxi 2000/TZ

## Turbine Gas Meter

- ▶ PTB approved with only 2 DN inlet straight pipe, 0 (zero) DN outlet pipe even with severe perturbations
- ▶ Go beyond compliance with all current European and International Standards
- ▶ Reduced pressure loss for low pressure network
- ▶ Excellent high-pressure behaviour
- ▶ IP 67 protection of the totaliser
- ▶ Equipped as standard with the cycle target.
- ▶ Various options available: integrated thermowells, oil pump, pulse transmitters, etc

Turbine gas meters are flow meters. The flow of gas turns a turbine wheel, and thus, the rotating speed of the turbine is proportional to the linear speed of the gas. The movement is mechanically transmitted to the totaliser through the magnetic coupling.

### 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.

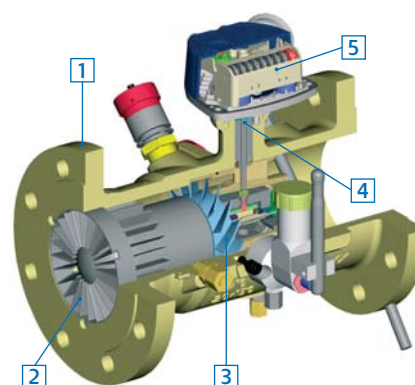
### Features

<b>Metrological approvals</b>	EC (PTB): 1.33-3271.51-ROM-E04.	
<b>Intrinsic safety approval</b>	L.C.I.E. 06 ATEX 6031 X Compliant with the Directive 94/9/EC	
<b>Flow rate</b>	From 8 m³/h to 10000 m³/h, G65 to G6500.	
<b>Nominal diameters</b>	From DN50 to DN500 mm (2" to 20").	
<b>Maximum working pressure</b>	up to 100 bar depending on the body material and flanging.	
<b>Mounting</b>	The Fluxi 2000/TZ meters can be installed either horizontally or vertically, for the DN50 to DN300, and horizontally for the DN400 and DN500.	
<b>Body materials</b>	Ductile iron, cast steel or welded steel. Compliant with the Pressure Equipment Directive 97/23/EC	
<b>Temperature range</b>	Ambient:	-30°C to +60°C
	Gas:	-30°C to +60°C
	Storing temperature:	-40°C to +70°C

### Description

The Fluxi 2000/TZ meter is composed of five main parts:

- ▶ a body containing all the components (1);
- ▶ a flow straightener to stabilise and accelerate the gas flow before the turbine wheel (2);
- ▶ a measuring unit including the turbine wheel (3);
- ▶ a magnetic coupling to transmit the movement of the turbine wheel to the totaliser (4);
- ▶ a totaliser to register the measured gas (5).



▶ Turbine Gas Meter Fluxi 2000/TZ  
DN150 ANSI600 G1000



► Turbine Gas Meter Fluxi 2000/TZ  
DN80 ISO PN16 G160



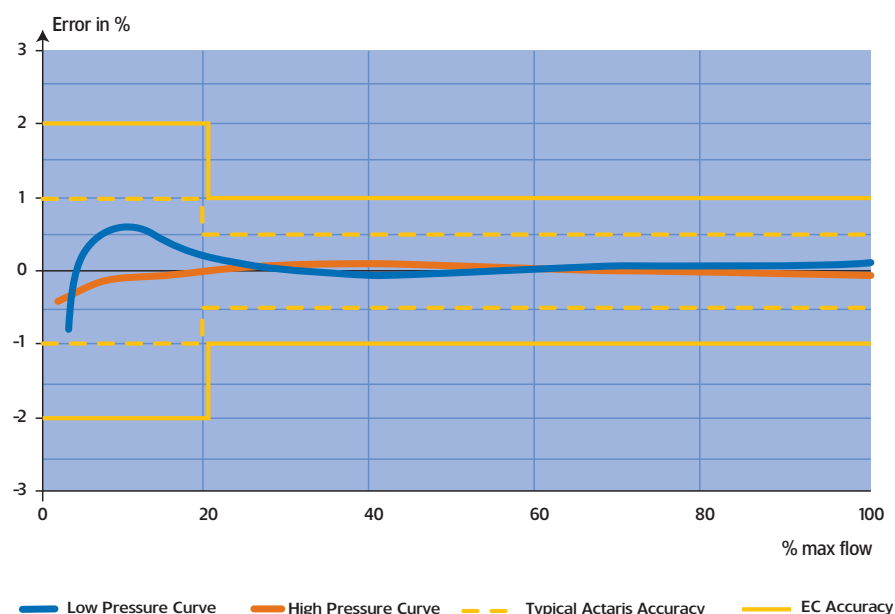
► Universal totaliser fitted as standard  
with the Cyble target

## Metrology

In accordance with EC and OIML standards. Depending on the G size and the DN, the meters are available with EC approval 1:20. Rangeability of 1:30, depending on the G size, is available as an option with a national approval. According to the PTB TR G7, for high-pressure tests, the rangeability can be extended to 1:50, depending on the pressure.

In line with EC standards, the maximum permissible error is  $\pm 2\%$ , from  $Q_{min}$  to  $0.2 Q_{max}$ , and  $\pm 1\%$  from  $0.2 Q_{max}$  to  $Q_{max}$ . The WME (Weighted Measured Error) is less than 0.4%.

Typical Actaris accuracy is  $\pm 1\%$  from  $Q_{min}$  to  $0.2 Q_{max}$ ,  $\pm 0.5\%$  from  $0.2 Q_{max}$  to  $Q_{max}$ .



### ► Totaliser:

- 9-digit index to register a larger volume
- 45° orientation for an easy reading
- Free-rotating totaliser
- Equipped as standard with the cyble target: it allows the installation of the cyble sensor at any time.
- Equipped with 1 built-in silicagel cartridge; as an option, equipped with an external cartridge to enable easy maintenance even in extreme conditions
- Fitted with a reflecting disc on the first drum.
- Integrated optical disc to facilitate the periodic calibration of the meter.
- Customised name plate (logo, bar-code, customer serial number...)
- IP67 protection
- UV resistant
- Unit:  $m^3$

### ► Transmitters

- 1 - Cyble sensor: It can be delivered mounted onto the meter or installed afterwards at any time. The Cyble sensor is a bounce-free transmitter. It allows also the counting of eventual back flows.
- 2 - Low Frequency (LF): Two Reed switches are fitted as standard on the whole range. Anti-tampering (AT): this device is fitted as standard on the whole range.
- 3 - Medium Frequency (MF): one transmitter is supplied as an option.
- 4 - High Frequency (HF): up to 3 transmitters are supplied as an option on the whole range: 2 fitted close to the turbine wheel (HF3), and 1 close to a reference wheel (HF2).
- 5 - Mechanical drive: the totaliser can be fitted with this option, it may be used to drive removable accessories. The mechanical drive is designed according to EN 12261.

### ► Oil pump

- 6 - An oil pump is supplied as an option, which lubricates the main ball bearings in the measuring unit. The oiling can be done even when the meter is under pressure.

### ► Turbine wheel

- 7 - This is the most important component of the meter for achieving high accuracy at low and high pressure. It can be made from aluminium for the whole range or in polyacetal for the DN≤200. Depending of the G size, the blades of the turbine wheel are oriented at 45° or 60°. Turbine wheel at 60° is used to avoid over-speed of the wheel. When a HF3 is requested, the wheel must be in aluminium. For high pressure use, or for measuring dirty gases, an aluminium wheel is recommended.

### ► Flow Straightener

- 8 - This device stabilises and accelerates the flow before the turbine wheel. It has been designed to meet the requirements of the 2 perturbation tests defined in the EN12261 (low level and high level perturbation). All DN meet the requirements of the low level perturbation test without an additional device with only 2 DN inlet straight pipe, 0 DN outlet of the meter. From DN80 to DN150, no additional device is required to fulfil the high level perturbation test with only 2 DN inlet, 0 DN outlet of the meter. From DN200 to DN400, a flow conditioner has to be integrated in the inlet of the flow straightener to meet the requirements of the high level perturbation test when only 2 DN inlet pipe is available (see in § Accessories). The large number of blades fitted in the flow straightener insures an optimal protection in case of perturbed flow.

### ► Options:

Extension for the totaliser

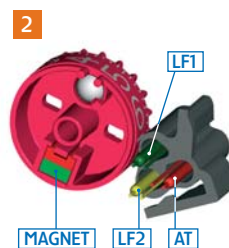
- 9 - This option allows the possibility of increasing the distance between the body of the meter and the index, to facilitate the reading when the meter is covered with ice due to measurement of gas at low temperatures.

### ► Pressure tapping:

This device allows the gas pressure to be measured at the reference point. It is installed as standard. The standard pressure tapping is an Ermeto 6 mm.

### ► Measurement of aggressive gases:

A version with a PTFE (Teflon) coating is available, as an option.



## Accessories

### Bracket for mounting a volume converter

This device allows the Actaris PTZ volume converter to be adapted directly onto the meter.

### Thermowells

This device allows the temperature of the measured gas to be read at the reference point, downstream of the turbine. As an option, the meter can be prepared for the installation of two thermowells in our factory and the devices inserted. If the meter has been prepared like this, the thermowells can be retrofitted without recalibration of the meter (defined in the type approval).

### Flow conditioner

For DN50 to DN200, a flow conditioner can be supplied for installation between 2 RF flanges in front of the meter, to further enhance the performance of the meter when subjected to severe perturbation. For DN200 to DN400 (3 x DN meters only), The flow conditioner can be retrofitted directly in the inlet of the flow straightener. The integration of the flow conditioner in the meter provides a very compact solution without need for any extra flanging.

### External silicagel cartridge

This accessory is used to carry out maintenance on the installed external silicagel cartridge in extreme conditions.



► Fluxi 2000/TZ  
with PTZ CORUS

## Characteristics

### A) Technical data sheet Rangeability and pulse values

With correction gears 32/40 (correction 0%)												
G size	DN (mm)	Max Flow (m³/h)	Range ability (1)	1 Imp LF & Cyble (m³/lmp)	Freq LF Qmax (HZ)	1 Imp MF (dm³/lmp)	Freq MF Qmax (HZ)	1 Imp HF2 (dm³/lmp)	Freq HF2 Qmax (HZ)	1 Imp HF3 (dm³/lmp)	Freq HF3 Qmax (HZ)	RPM Qmax (Rot/min)
G65	50	100	10	0.1	0.28	5.26316	5.28	-	-	0.00866	3208	16040
G100	80	160	20	1	0.04	23.05476	1.93	0.07586	586	0.03793	1172	5859
G160		250	20 or 30		0.07	23.05476	3.01	0.07586	915	0.03793	1831	9154
G250		400	20 or 30		0.11	39.02439	2.85	0.1284	865	0.0642	1731	8653
G160	100	250	20	1	0.07	23.05476	3.01	0.06265	1108	0.06265	1108	4157
G250		400	20 or 30		0.11	23.05476	4.82	0.06265	1774	0.06265	1774	6651
G400		650	20 or 30		0.18	39.02439	4.63	0.10604	1703	0.10604	1703	6385
G400	150	650	20	1	0.18	23.05476	7.83	0.1537	1175	0.1537	1175	3524
G650		1000	20 or 30		0.28	23.05476	12.05	0.1537	1807	0.1537	1807	5422
G1000		1600	20 or 30		0.44	39.02439	11.39	0.26016	1708	0.26016	1708	5125
G650	200	1000	20	10	0.03	230.5475	1.2	0.37625	738	0.37625	738	2215
G1000		1600	20 or 30		0.04	230.5475	1.93	0.37625	1181	0.37625	1181	3544
G1600		2500	20 or 30		0.07	390.2439	1.78	0.63687	1090	0.63687	1090	3271
G1000	250	1600	20	10	0.04	230.5475	1.93	0.57815	769	0.57815	769	1922
G1600		2500	20 or 30		0.07	230.5475	3.01	0.57815	1201	0.57815	1201	3003
G2500		4000	20 or 30		0.11	390.2439	2.85	0.97862	1135	0.97862	1135	2838
G1600	300	2500	20	10	0.07	217.9836	3.19	0.85685	810	0.85685	810	1737
G2500		4000	20 or 30		0.11	217.9836	5.1	0.85685	1297	0.85685	1297	2779
G4000		6500	20 or 30		0.18	390.2439	4.63	1.53398	1177	1.53398	1177	2522
G2500	400	4000	20	10	0.11	217.9836	5.1	2.04487	543	2.04487	543	1164
G4000		6500	20 or 30		0.18	217.9836	8.28	2.04487	883	2.04487	883	1892
G6500		10000	20 or 30		0.28	390.2439	7.12	3.66082	759	3.66082	759	1626
G4000	500	6500	20 or 30	10	0.18	217.9836	8.25	2.04487	883	2.04487	883	1892
G6500		10000	20 or 30		0.28	390.2439	7.12	3.66082	759	3.66082	759	1626

(1) For greater than 1:20, refer also to your National Approval.

## Body materials and approximate weight (Kg)

DN (mm)	Length of body (mm)	ISO PN 10-16	ISO PN 20	ISO PN 25	ISO PN 40	ISO PN 50	ISO PN 110	ANSI 150	ANSI 300	ANSI 600
50	150	A <sup>(1)</sup> 8	A <sup>(1)</sup> B <sup>(1)</sup> 8	A <sup>(1)</sup> 8	A <sup>(1)</sup> 8	B <sup>(2)</sup> 11	B <sup>(2)</sup> 11	A <sup>(1)</sup> B <sup>(1)</sup> 8	B <sup>(2)</sup> 11	B <sup>(2)</sup> 11
80	240	AB 19	AB 19	AB 19	AB 19	B 30	B 37	AB 19	B 30	B 37
100	300	AB 22	AB 22	B 25	B 25	B 45	B 55	AB 22	B 45	B 55
150	335	A <sup>(1)</sup> 46	A <sup>(1)</sup> 46	-	-	-	-	A <sup>(1)</sup> 46	-	-
150	450	AB 54	AB 54	B 54	B 54	B 80	B 95	AB 54	B 80	B 95
200	600	AB 83	AB 83	B 83	B 110	B 130	B 150	AB 83	B 130	B 150
250	750	B 120	B 120	B 120	B 140	B 220	B 245	B 120	B 220	B 245
300	900	B 190	B 190	B 190	B 220	B 265	B 265	B 190	B 265	B 295
400	1200	B 440	B 440	B 440	B 490	B 680	B 740	B 440	B 680	B 740
500	1500	B 580	B 580	B 580	B 640	B 770	B 950	B 580	B 770	B 950

A: Ductile iron EN-GJS-400-18LT (GGG40.3)

B: Steel (Cast steel GS or welded steel)

(1) Thermowells and HF2 not available

(2) HF2 not available, model available under specific conditions

**Note:** for the pressure and temperature range of the body material, please check your National Rules

## C) Dimensions (mm)

DN	L	L short*	A	A short*	B	B short*	C	D
50	150	-	60	-	45	-	125	170
80	240	-	100	-	60	-	150	175
100	300	-	125	-	85	-	175	190
150	450	335	185	92	125	101	205	200
200	600	-	240	-	175	-	230	235
250	750	-	330	-	275	-	300	265
300	900	-	300	-	300	-	300	295
400	1200	-	400	-	550	-	350	345
500	1500	-	500	-	750	-	390	378

\* Short version, same length as for the former NM meter

## B) Pressure loss of the Fluxi 2000/TZ meters

				Pressure losses of the Fluxi 2000/TZ meter (mbar)	
G size	DN (mm)	Max. Flow (m³/h)	Standard ΔPr	With integrated flow conditioner ΔPr	
			ρ=0.83kg/m³. T=0°C. Qmax	ρ=0.83kg/m³. T=0°C. Qmax	
G65	50	100	9.1	-	
G100	80	160	2.4	-	
G160		250	5.9		
G250		400	12.8		
G160	100	250	2.2	-	
G250		400	5.4		
G400		650	11.8		
G400	150	650	2.7	-	
G650		1000	6.6		
G1000		1600	13.8		
G650	200	1000	1.6	2.6	
G1000		1600	4.0	6.3	
G1600		2500	8.7	13.7	
G1000	250	1600	2.1	3.3	
G1600		2500	5.0	8.0	
G2500		4000	11.0	17.3	
G1600	300	2500	2.0	3.2	
G2500		4000	5.0	7.8	
G4000		6500	9.5	17.0	
G2500	400	4000	1.8	2.8	
G4000		6500	4.4	6.8	
G6500		10000	9.5	14.9	
G4000	500	6500	4.4	6.8	
G6500		10000	9.5	14.9	

Calculation of pressure loss:

$$\Delta p = \Delta p_r \times \frac{\rho_n}{0.83} \times (P_b + 1) \times \left[ \frac{q}{Q_{max}} \right]^2 \times \left[ \frac{273}{(273 + T_b)} \right]$$

Where:

Δp: Pressure loss in the calculated conditions

Δp<sub>r</sub>: Pressure loss in the reference conditions

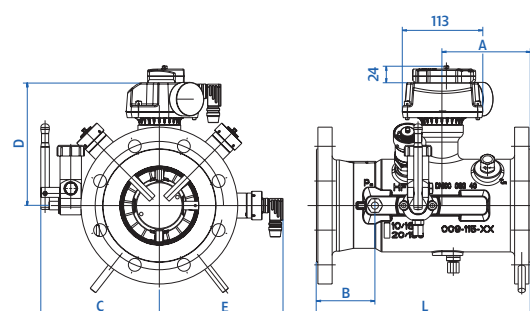
ρ<sub>n</sub>: Gas density (kg/m³) at 0°C and 1013 mbar

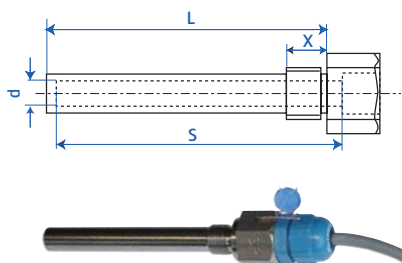
P<sub>b</sub>: Operating pressure (Bar gauge)

q: Flow rate (m³/h)

Q<sub>max</sub>: Maximum flow rate (m³/h)

T<sub>b</sub>: Gas temperature (°C)





► Thermowell fitted with sealing holes

## D) Thermowells sizes

DN	Thread	Order Number with PG screw. o-ring	d bore mm	d Cable mm	Max. Setting Depth (S) Sensor (mm)	L mm	X mm
80/100	G 1/4 A	E952-014-04	7.5	4-8	60	59	12
50/150/200	G 1/4 A	E952-014-14	7.5	4-8	90	93	12
250/500	G 1/2 A	E952-014-05	8	4-8	150	147	14

## E) Transmitter characteristics

Intrinsic safety approval: L.C.I.E. 06 ATEX 6031 X

Intrinsic safety level: II 1/2 G EEx ia IIB/IIC T5 or T6

### Low Frequency pulse transmitter (LF):

The LF transmitter consists of 2 dry Reed switches, normally open, and controlled by a magnet situated in the first drum of the totaliser. The LF connections are without polarity.

*Characteristics of LF transmitter:*

- Hermetically sealed contacts
- Maximum terminal voltage: 30 Volt and maximum current according to EN50020.
- Maximum temperature: +60°C
- Minimum pulse time: 0.4 sec
- Cyble sensor:
  - It conforms to CENELEC standard EN50020 with:
    - $U_i \leq 14,3$  Volt
    - $I_i \leq 50$  mA

### Anti-tampering transmitter (AT):

This consists of one dry Reed switch, normally closed. Attempts at magnetic tampering will open the contact. The electrical characteristics are the same as those for the LF transmitter.

### Inductive transmitters (MF and HF):

They are inductive sensors actuated by a toothed disc. The frequency is proportional to the instantaneous flow. The polarity of the connections is indicated on the name plate of the meter.

*Characteristics of transmitters:*

- Proximity detector conform to EN50227 (and NAMUR) standards
- They conform to CENELEC standards (EN50014 and 50020) with
  - $U_i \leq 15$  Volt
  - $I_i \leq 50$  mA
  - $P_i \leq 120$  mW
- Maximum temperature: + 60°C

## F) Installation

Each meter is delivered with binder plugs for the installed transmitters and oil when an oil pump is installed. Please refer to the instruction manual supplied with the meter.

The advice given therein will ensure optimal use of the Fluxi 2000/TZ meter over the years.

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