

Cold water meters



1. Introduction

1.1

Applications for the Water Utilities

- Measuring the consumption of drinking water
- Domestic consumption with TOPAZ water meters
- Large flows with RUBY water meters

1.2

Your advantages

- Complete system for water measurement under extremely varied conditions
- Choice between local and remote reading
- Wide range of applications in all supply sectors, thanks to the modular structure of the systems

TOPAZ impeller meters

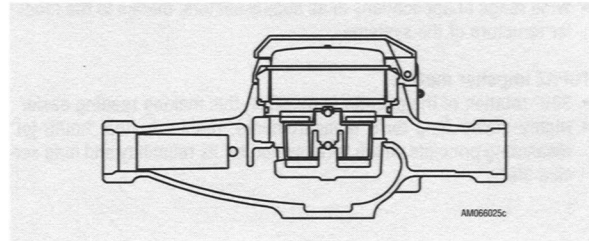
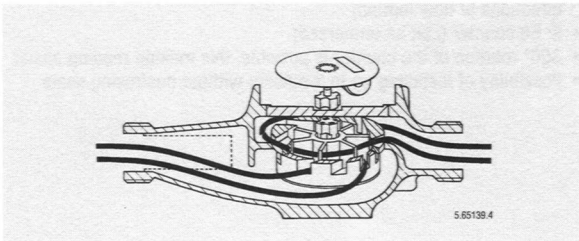
- 360° rotation of the counter is possible, this making reading easier
- Highly stable long-term measurements, thanks to the "multi-jet" measuring principle which is renowned for its reliability and long service life

Operating principle: TOPAZ multi-jet utility water meters

- The TOPAZ series falls under the category of multi-jet velocity meters. This measuring principle has proven its excellence over a long period: This measuring principle is insensitive to turbulences in the liquid flow.
- The impeller is subject to a uniform impingement of jets around its circumference, allowing a particularly low starting flow and therefore a wide measurement range.
- Since the impeller is not subject to any asymmetrical loadings, wear is kept to a minimum and the intervals between inspections can be extended.
- The bearings for the impeller are two glass balls (N1.5 to N6) which in practice are separated from their sapphire bearing cups by a thin

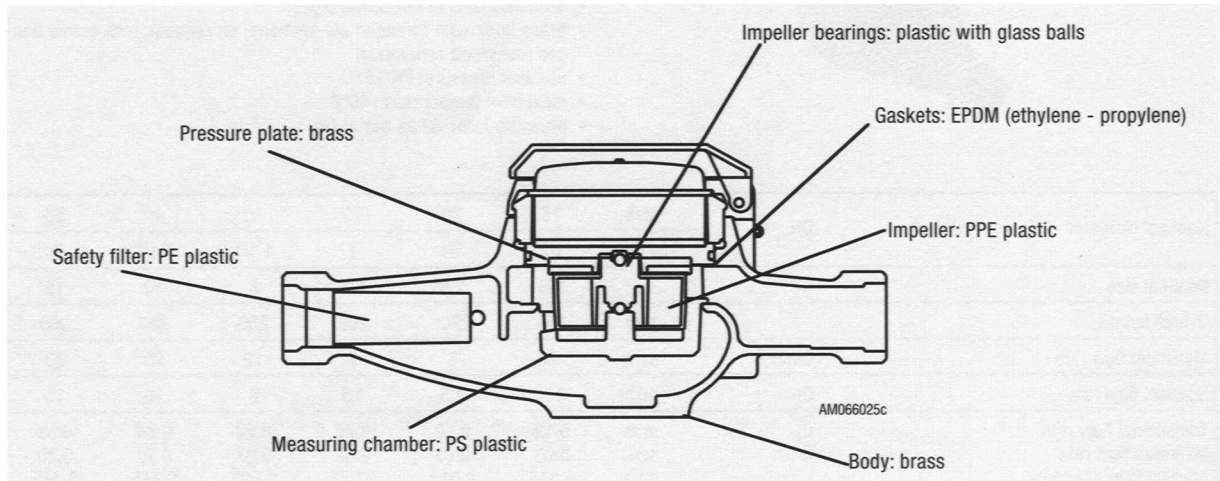
film of water, this allowing the impeller to turn both easily and accurately, ensuring long-term stability.

- The measuring device (hydraulic part) is entirely separated from the roller or electronic counter (dry-type registering unit). The impeller rotations are transmitted across a sturdy sealing plate by means of a magnetic coupling.
- For optimal ease of reading, the counter (if not fitted with a pulser) can be rotated through 360°.
- The adjusting device to calibrate the meter is not accessible from the exterior (N1.5 to N6) which prevents any possibility of accidental or unauthorised manipulation.



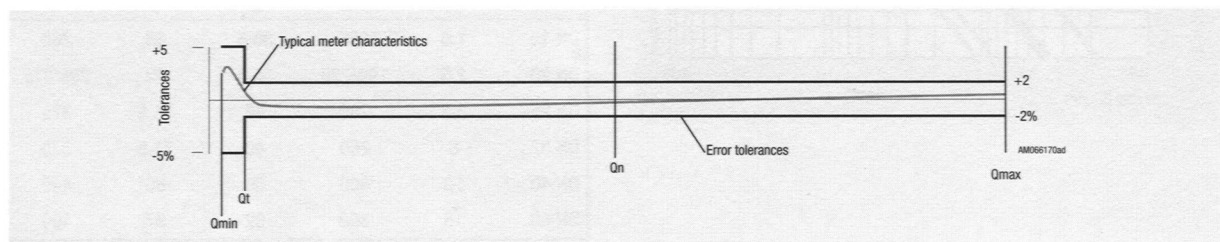
Hydraulic components - materials

TOPAZ utility water meters



Error tolerances under reference conditions (ISO 4064)

Reference conditions: liquid measured: water temperature: 20°C



$Q_{min} \leq Q < Q_t$ lower flow rate range
 $Q_{min} \leq Q \leq Q_{max}$ upper flow rate range

Technical information

2. TOPAZ multi-jet utility water meters



TOPAZ PMK

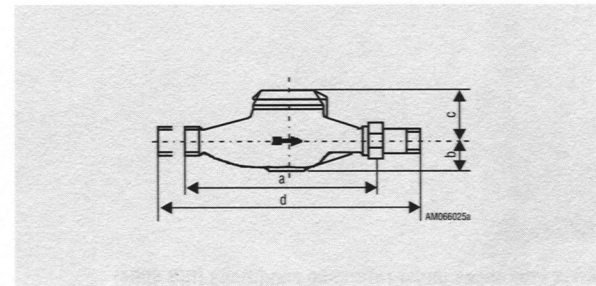
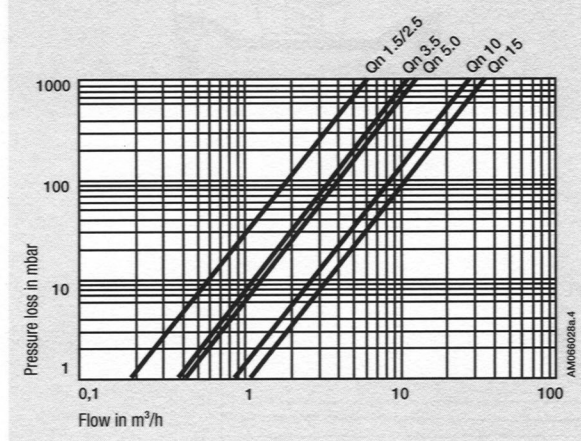
- multi-jet impeller meters with dry-type registers
- better than Metrological Class B, according to ISO 4064
- error tolerances: $\pm 2\%$ of flow rate in the upper measuring range $Q_t \leq Q \leq Q_{max}$, and $\pm 5\%$ in the lower measuring range $Q_{min} \leq Q < Q_t$
- for installation in horizontal pipes
- brass body with threaded connections; on request, with screw flanges (delivered separately)
- nominal pressure: PN 16
- maximum temperature: 40°C
- pressure loss: < 0.25 bar at Q_n

Nominal diameter	DN	mm	15	20	25	32	40	50
		inches	1/2	3/4	1	1 1/4	1 1/2	2
Nominal size	N		1.5	2.5	3.5	6	10	15
Overall length		mm	165	220 ¹⁾	260	260	300	300
Maximum flow rate	Q_{max} ²⁾	m ³ /h	3	5	7	12	20	30
Nominal flow rate	Q_n	m ³ /h	1.5	2.5	3.5	6	10	15
Transitional flow rate	Q_t	m ³ /h	0.12	0.12	0.28	0.28	0.80	0.80
Minimum flow rate	Q_{min}	m ³ /h	0.03	0.03	0.07	0.07	0.20	0.20
Starting flow at approx.		m ³ /h	0.014	0.014	0.022	0.022	0.045	0.045
Smallest readable volume		litres	0.1	0.1	0.1	0.1	0.1	0.1
Recording capacity		m ³	100.000	100.000	100.000	100.000	100.000	100.000
Recording capacity at Q_n without zeroing		h	66'666	40'000	28'570	16'660	10'000	6'666
Body thread size		inches	3/4	1	1 1/4	1 1/2	2	2 3/8
Connector thread size		inches	1/2	3/4	1	1 1/4	1 1/2	2
Body surface finish			polished brass					
Weight without connections		approx. kg	1.4	1.6	2.4	2.7	5.4	6.7

1) available with overall length of 190 mm
2) max. 1 h per day

3) at least 2000 h are required by the standards

Pressure loss curves for PMK, PMKS and PMKF



	N	a	b	c	d
DN 15	1.5	165	36.5	63	260
DN 20	2.5	190/220	36.5	63	285/315
DN 25	3.5	260	40	71.5	375
DN 32	6	260	40	71.5	375
DN 40	10	300	60	80	440
DN 50	15	300	62	87	460

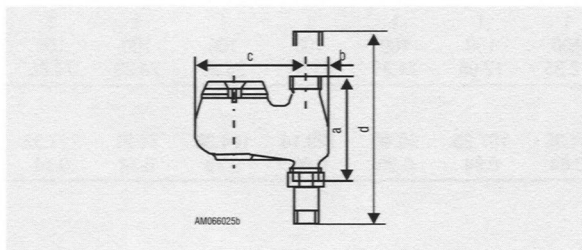


TOPAZ PMKF (downward flow) and TOPAZ PMKS (upward flow)

- multi-jet impeller meters with dry-type registers
- better than Metrological Class B, according to ISO 4064
- error tolerances: $\pm 2\%$ of flow rate in the upper measuring range $Q_t \leq Q \leq Q_{max}$, and $\pm 5\%$ in the lower measuring range $Q_{min} \leq Q < Q_t$
- for installation in vertical pipes (PMKF (downward flow ↓) and PMKS (upward flow ↑))
- brass body with threaded connections; on request, with screw flanges (delivered separately)
- nominal pressure: PN 16
- maximum temperature: 40°C
- pressure loss: < 0.25 bar at Q_n

Nominal diameter	DN	mm	20	25	32	40
		inches	3/4	1	1 1/4	1 1/2
Nominal size	N		2.5	3.5	5	10
Overall length		mm	105	150	150	200
Maximum flow rate	Q_{max} ¹⁾	m ³ /h	5	7	10	20
Nominal flow rate	Q_n	m ³ /h	2.5	3.5	5	10
Transitional flow rate	Q_t	m ³ /h	0.12	0.28	0.28	0.80
Minimum flow rate	Q_{min}	m ³ /h	0.03	0.07	0.07	0.20
Starting flow at approx.		m ³ /h	0.014	0.022	0.022	0.045
Smallest readable volume		litres	0.1	0.1	0.1	0.1
Recording capacity		m ³	100'000	100'000	100'000	100'000
Recording capacity at Q_n without zeroing	²⁾	h	40'000	28'750	20'000	10'000
Body thread size		inches	1	1 1/4	1 1/2	2
Connector thread size		inches	3/4	1	1 1/4	1 1/2
Body surface finish			polished brass			
Weight without connections		approx. kg	1.8	2.4	2.7	5.0

1) max. 1 h per day
2) at least 2000 h are required by the standards



	N	a	b	c	d
DN 20	2.5	105	25	126	200
DN 25	3.5	150	30	147.5	265
DN 32	5	150	30	147.5	265
DN 40	10	200	50	200	340



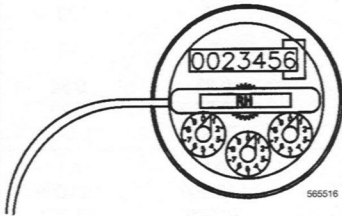
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Mechanical roller counters for PMK, PMKF and PMKS

The vacuum sealed counter module has a transparent and shockproof top. The rollers with black digits display the water consumed in cubic metres. The flow indicator wheel at the centre of the counter is used for monitoring purposes; it rotates at the same speed as the impeller. The three pointers indicate sub-multiples of cubic metres (for example: 10 litres, 1 litre).

PMK	15	20	25	32	40	50
PMKF		20	25	32	40	
PMKS		20	25	32	40	

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Pulsers for PMK, PMKF and PMKS

All the mechanical counters of the TOPAZ range of meters may be replaced by counters with pulsers. These pulsers are intended for connection to the AMSTACK range of remote counter devices – see the section on "Auxiliary Equipment".

When selecting the pulser, the points specified in the section on "Planning and installation design" should also be taken into account. Technical information and connection diagramme appear in the section on "Pulsers".

Nominal diameter	DN	mm	15	20	25	32	32	40	50
		inches	1/2	3/4	1	1 1/4	1 1/4	1 1/2	2
Nominal size	N		1.5	2.5	3.5	5	6	10	15
Pulse values: PMK, PMKF, PMKS									
RH1	Reed switch	litres/pulse	1	1	1	1	1	1	1
RH100	Reed switch	litres/pulse	100	100	100	100	100	100	100
IH	Inductive proximity switch	ml/pulse	12.95	12.95	21.51	21.51	26.80	74.86	74.86
Pulse frequencies									
IH	at Qmax	Hz	64.35	107.25	90.40	129.14	124.38	74.21	111.32
	at Qmin	Hz	0.64	0.64	0.90	0.90	0.73	0.74	0.74

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Technical information

4. Pulsers

TOPAZ pulsers, integrated with the roller counter



Reed pulsers
RH 100 for remote counting
RH 1 for control applications



IH inductive pulser
for control applications and for
determining instantaneous flow rates.

Power supply for pulsers

The pulsers listed above are passive. They must be powered by means of the auxiliary devices to which they are connected. Each pulse that is generated corresponds to one unit of volume.

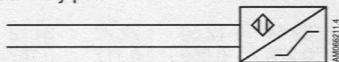
Requirement of the auxiliary device

The pulse duration depends on the flow rate. If the flow is stopped, a continuous pulse may occur. The auxiliary device must be able to tolerate this; if this is not the case, then provision for a protective device should be made, such as a WE77 separating relay.

Reed pulsers



Inductive proximity pulsers



Correct pulse evaluation

When the flow is stopped, low frequency oscillations of the water in the installation may occur (hydraulic vibrations), which can cause pulses to be generated. These are transmitted to the device connected to the pulser which cannot differentiate between these "false" pulses and the ones which it receives when the installation is operating. When an instantaneous flow rate is being determined, this phenomenon is not critical, given that the pulse frequency is very low. But when the pulses are intended for counting, the installation should be designed so as to avoid hydraulic vibrations (for example, by means of non-return valves).

Choice of a suitable pulser

The choice of a suitable pulser and an adequate pulse value depends on the application. For remote counting, low resolution pulse values are generally preferable (for example Reed RH 100 pulser, pulse value 100 l). On the other hand for analogue signals instantaneous flow rates and filling controls, high resolution pulse values should be selected (for example IH inductive pulser with a pulse value of less than 0.1 l). Reed pulsers can only be used if the auxiliary device is battery-powered.

Technical data: TOPAZ pulsers

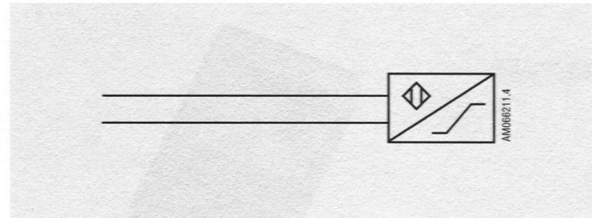
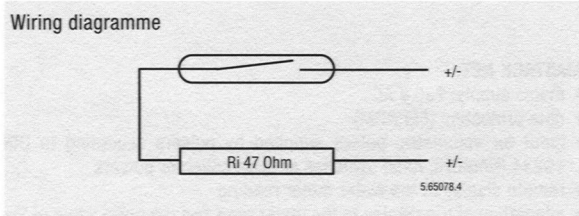
Reed RH pulsers with decadic pulse values

Switch	Reed contact tube protected with an inert gas filling.
Switch voltage	max. 48 V AC or DC
Switch current	max. 50 mA (internal resistance: 47Ω/0.5 W)
Quiescent current	Contact open
Switch power	max. 2 W
Ambient temperature	-10 ... +70°C
Protection class	IP 65, according to IEC 144 (protection against water jets and dust)
Connections	Fixed grey cable, length: 3 m, cross-section: 2 x 0.35 mm ²
Use in Ex-zones	The RH pulser is a normally open, potential-free contact which can be connected to an Exi supply. Please consult your specialist on this subject!

IH inductive pulser with non-decadic pulse values

Switch	Inductive proximity switch according to DIN 19234
Switch voltage	5 ... 15 VDC
Switch current	> 3 mA (at 8 V, 1 kΩ)
Quiescent current	<1.35 mA (at 8 V, 1 kΩ)
Ambient temperature	-10 ... +70°C
Protection class	IP 65, according to IEC 144 (protection against water jets and dust)
Connections	Fixed grey cable, length: 3 m, cross-section: 2 x 0.35 mm ²
Use in Ex-zones	Not intended for this purpose

Wiring diagramme





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