

TRZ / TRZ - IFS

Turbine gas meters for custody transfer



Applications

- **Gas distribution in low pressure networks:**
The most important characteristics in this respect are reliability, safety, secure gas supply and compact dimensions.
- **Gas transport at high operating pressures:**
The Elster TRZ is special because of its high metering accuracy, long-term stability and its compact design.
- **Master meters for low and high-pressure test rigs:**
Because of its high accuracy and reproducibility, the TRZ is particularly suitable for use as a master meter.

Compliance

Elster TRZ/TRZ-IFS meters are manufactured in accordance with DIN EN ISO 9001 and have a DIN-DVGW registration. They comply with European requirements and international standards (et al. EN 12261, OIML, etc.).

Materials

Depending on the pressure rate, the housings are made of spheroidal graphite cast iron, cast steel or welded steel. The meters meet the highest safety standards and are fire-proof (HTB). In order to achieve the highest measuring accuracy, the turbine wheel is made of aluminium.

Brief information

Elster TRZ/TRZ-IFS turbine gas meters are robust meters for use in stationary conditions. Over a number of years they have proved themselves to be highly accurate and reliable devices for measuring the flow of gaseous substances.

The gas flowing through the meter sets a turbine wheel in motion and the number of revolutions of the wheel is proportional to the volume of gas flowing through the meter. The gas entering the meter is accelerated by a displacement body located at the meter inlet. The displacement body is designed in such a way that any potential flow disturbances such as swirl or asymmetric flow are eliminated.

Because the flow velocity is increased, the driving impulse on the turbine wheel is also strengthened. This means that it is possible to achieve a high accuracy within the permissible error limits, even with low flow rates. The flow onto the turbine wheel is axial and the wheel is run on the main shaft with over-sized precision ball bearings.

The revolution of the turbine wheel is reduced by a gear. Via a magnetic coupling, a transmission shaft drives the 8-digit mechanical roller counter located in the pressureless totalizer head. After the gas has passed the turbine wheel, a pressure recovery is achieved in the long outlet channel, which is designed to create the optimum flow conditions.

With the patented Elster measuring cartridge it is possible to save service time, replace the cartridge and adjust the measuring range on site.

The measuring cartridge is supported with O-rings, is free of tension and is, therefore, not affected by any influences stemming from the housing or the ambient conditions such as temperature fluctuations.

With the four pressure registration holes in the flow body, it is possible to register a steady reference pressure (p_r).

Main features TRZ/TRZ-IFS

- Turbine gas meters with measuring cartridges
- Meter types G 65 - G 16000
- Flow range 5 - 25000 m³/h
- Diameters DN 50 - DN 600
- Pressure rates PN 10 - 100 and ANSI 150 - 600
- Length 3 DN
- Thermowells built into meter housing (optional)
- Absolute-ENCODER S1 (optional)
- PTB and international approval
- Media: natural gas, petroleum gas, city gas, butane, ethylene, air, nitrogen further gases on request

Main features TRZ-IFS

- Compact installation, inlet pipe length $L \geq 2$ DN without additional flow straightener
- Integrated flow straightener
- DN 80 - DN 400 (DN 500 - 600 on request)

Accuracy

Limits

According to EU standards:

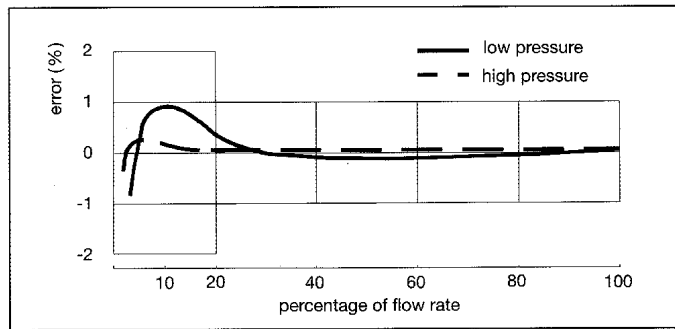
±1% of 0.2 Q_{max} – 1.0 Q_{max}

±2% of Q_{min} – 0.2 Q_{max}

Optional half deviation band:

±0.5% of 0.2 Q_{max} - 1.0 Q_{max}

±1% of Q_{min} - 0.2 Q_{max}



Measuring range

The low-pressure measuring range (atmospheric pressure) is 1:20 and 1:30 (see table with technical data).

When the actual pressure rises, the flow limit Q_{min} becomes lower because of the increasing motive energy. The effective measuring range is therefore larger. Q_{min, HP} is shown in the table on the right. It should be noted that the permissible measuring ranges are defined by national regulations.

G	Q _{max} m ³ /h	Q _{min, LP} m ³ /h	Actual pressure (absolute) in bar							
			5	10	15	20	25	30	35	40
			Q _{min, HP} m ³ /h							
65	100	5	3	2	2	1	1	1	1	1
100	160	8	4	3	3	2	2	2	2	2
160	250	13	7	5	4	4	3	3	3	3
250	400	20	11	8	6	6	5	5	4	4
400	650	32	17	12	10	9	8	7	7	6
650	1000	50	27	19	16	13	12	11	10	10

The measuring ranges for other meters are calculated by multiplying by 10 or 100 E.g. If you multiply the values for the G100 by 10, you get the values for the G1000 (Q_{max} = 1600 m³/h).

Pressure loss

The pressure losses of all turbine gas meters with Q_{max} under atmospheric

conditions for air are below the maximum values mentioned in section 5,2,9 (table 8)

by EN 12261.

Pulsers

Low frequency: Elster TRZ and TRZ-IFS turbine gas meters are fitted with two low-frequency pulsers and one switch for monitoring any attempts at manipulation (PCM). The low-frequency pulses, which are generated by Reed switches in the plug-in pulser IN-S1x, are used to transmit the actual volume in m³ to a volume corrector, for example. The maximum frequency is 0.5 Hz.

Standard version: IN-S10 with a 2.5m open-ended 6-wire cable.

Options:

IN-S11 with a 6-pin flange plug and a connector socket (Binder 423 system).

IN-S12 with two 6-pin flange plugs and two connector sockets (Binder 423 system).

High frequency (optional):

If higher pulse rates or a higher resolution is required for control or regulation purposes, the turbine meter can be equipped with high-frequency pulsers. A special feature of the Elster TRZ / TRZ-IFS is the fact that there are two separate systems: Model A1R picks up reference boreholes in the turbine wheel.

Model A1S picks up the blades of the turbine wheel.

Two high-frequency pulsers can be ordered for each of the two models.

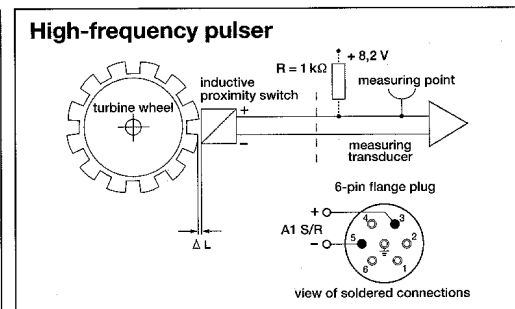
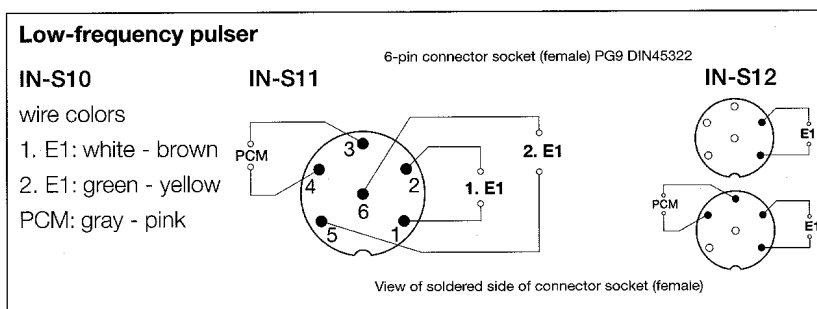
The maximum frequency is 2500 Hz.

The plugs for the high-frequency pulsers are designed to save space. They are located at an angle on the side of the housing and can be rotated.

Totalizer and totalizer head

- 8-digit mechanical counter
- Totalizer head can be rotated 350°
- Protection class IP67
- Absolute-ENCODER S1 useable as main meter index

Pin assignment



Maintenance

- Version with life-time self-lubricating bearings requires no maintenance.
Deadline for recalibration: 8 years in Germany
- Version with an oil pump: regular (frequency depends on type of gas) lubrication using a manually-operated oil pump.
Deadline for recalibration: >12 years in Germany

Safety and quality

- HTB (fire-proof) DVGW-tested, material certification in accordance with EN 10204 3.1
 - Pressure and strength tests as well as final inspection in accordance with DIN DVGW G 491
 - Every meter is calibrated on a PTB-approved test rig
- In order to increase the accuracy and extend the measuring range, it is recommended to carry out a high-pressure test using natural gas under conditions similar to actual operating conditions.
On request, Elster TRZ are delivered including low and high-pressure certificates.

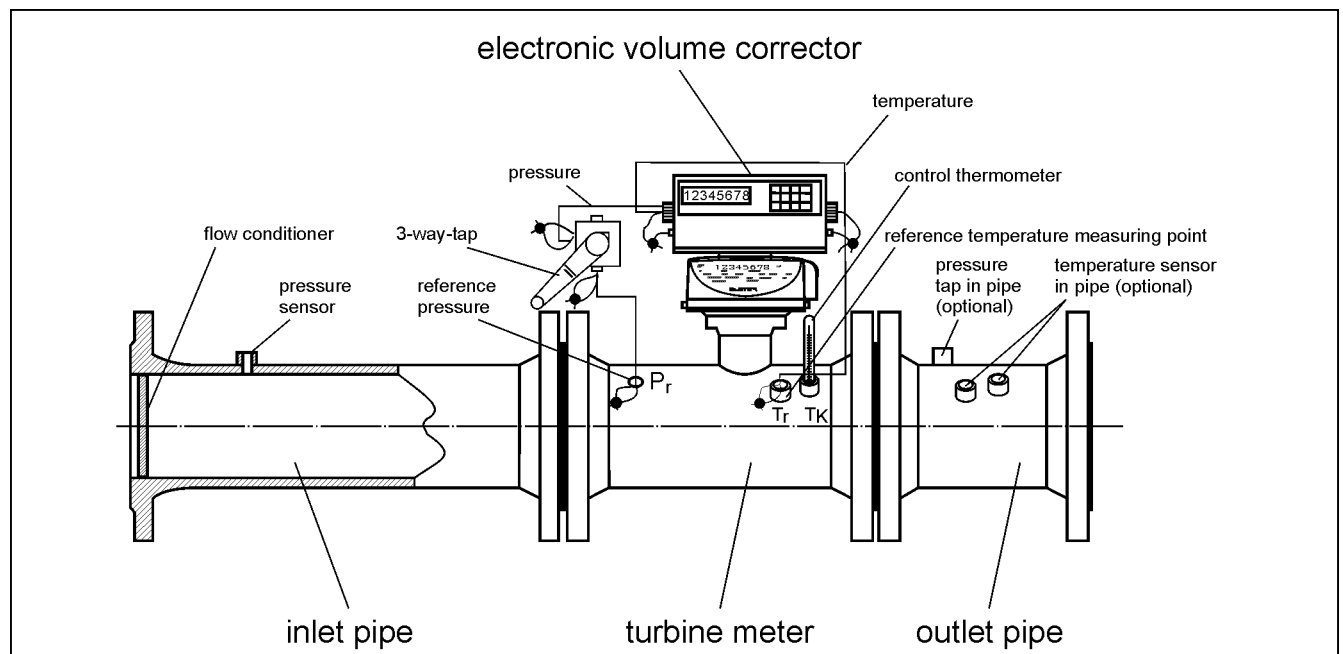
Compact system including volume corrector

A compact system comprising meter, volume corrector, temperature and pressure measurement can be ordered as a pre-assembled unit or can easily be assembled on site.

Because the thermowells are built into the meter, it is no longer necessary to

have any additional welded connections in the outlet pipe.

Completely pre-assembled metering pipe sections including inlet and outlet pipes, flow straighteners and calibration can also be supplied.



TRZ metering system including pre-assembled inlet and outlet pipes and volume corrector.

Installation

Elster recommends a horizontal installation. Meters with self-lubricating bearings can also be installed in a vertical position. If the oil pump version is to be installed in a vertical position, the oil pump must be turned around 90° before it leaves the factory. Please state this when ordering.

Installation in accordance with PTB TR G13

Inlet pipe:
straight pipe with the same diameter as the meter (DN); length $L \geq 2 \text{ DN}$

Outlet pipe:
molded fitting with the same diameter as the meter (DN); length $L = 2 \text{ DN}$

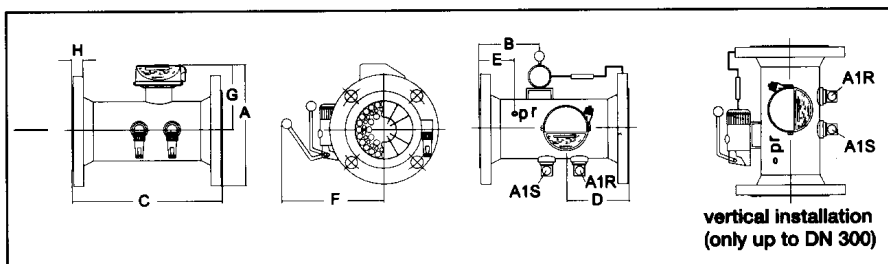
Technical Data

Measuring data	Diameter DN	50	80	80	80	100	100	100	150	150	150	150	
	Meter size G	65	100	160	250*	160	250	400*	250	400	650*	1000*	
	Measuring range* Q _{min}		5	8	13	20	13	20	32	20	32	50	80
		Q _{max}	100	160	250	400	250	400	650	400	650	1000	1600
	Accuracy		< ± 1% (< ± 0.5% high pressure) from 0.2 Q _{max} to Q _{max} ; < ± 2% (< ± 1% high pressure) from Q _{min} to 0.2 Q _{max}										
Temperature	gas	- 20°C to + 60°C											
	ambient	- 20°C to + 70°C (other temperatures on request)											
Housing	Pressure rates	PN 10, 16, 25, 40, 64, 100 / ANSI 150, 300, 600											
	Dimension A for flange PN 16	A mm	275	315	315	315	325	325	325	325	415	415	415
		B mm	-	100	100	100	85	85	85	85	212	212	212
		C mm	150	240	240	240	300	300	300	300	450	450	450
		D mm	75	100	100	100	120	120	120	120	180	180	180
		E mm	45	74	74	74	85	85	85	85	132	132	132
		F mm	-	160	160	160	180	180	180	180	200	200	200
		G mm	190	214	214	214	219	219	219	219	246	246	246
Assembly	Housing with flanges in accordance with PN or ANSI												
Weight (kg)	Cast steel, PN16	9	20	20	20	28.5	28.5	28.5	50.5	50.5	50.5	50.5	
	Cast steel, ANSI600	11	23.5	23.5	23.5	48	48	48	93	93	93	93	
Outputs / pulse values** (imp/m³)	LF-type E1 (Reed switch)	10	1	1	1	1	1	1	1	1	1	1	
	HF-type A1R (inductive)	28000	10500	10500	10500	6630	6630	6630	6630	2560	2560	2560	
	HF-type A1S (inductive)	-	21000	21000	21000	13260	13260	13260	-	5120	5120	5120	

* Meter also available with measuring range 1:30

** Deviations are possible

Measuring data	Diameter DN	200	200	250	250	250	300	300	400	400	500-600
	Meter size G	1000	1600*	1000	1600*	2500*	2500	4000*	4000	6500	on request
	Measuring range* Q _{min}		80	130	80	130	200	200	320	320	500
		Q _{max}	1600	2500	1600	2500	4000	4000	6500	6,500	10000
	Accuracy		< ± 1% (< ± 0.5% high pressure) from 0.2 Q _{max} to Q _{max} ; < ± 2% (< ± 1% high pressure) from Q _{min} to 0.2 Q _{max}								
Temperature	gas	-20°C to +60°C									
	ambient	-20°C to +70°C (other temperatures on request)									
Housing	Pressure rates	PN 10, 16, 25, 40, 64, 100 / ANSI 150, 300, 600									
	Dimension A for flange PN 16	A mm	475	475	565	565	565	615	615	725	725
		B mm	245	245	330	330	330	440	440	640	640
		C mm	600	600	750	750	750	900	900	1200	1200
		D mm	255	255	330	330	330	300	300	400	400
		E mm	170	170	260	260	260	400	400	600	600
		F mm	405	405	450	450	450	480	480	530	530
		G mm	319	319	345	345	345	372	372	423	423
Assembly	Housing with flanges in accordance with PN or ANSI										
Weight (kg)	Cast steel, PN16	90	90	110	110	110	158	158	325	325	
	Cast steel, ANSI600	140	140	262	262	262	313	313	600	600	
Outputs / pulse values** (imp/m³)	LF-type E1 (Reed switch)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
	HF-type A1R (inductive)	1764	1764	852	852	852	624	624	357	357	
	HF-type A1S (inductive)	1764	1764	852	852	852	624	624	357	357	



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TRZ TRZIFS EN04

A20050729