Connected Industrial

Two-in-One Redundant Multi-path Ultrasonic Gas Meter for Custody Transfer Measurement

Brief information

Assured measurement and operational integrity with redundancy.

This meter combines two measurements in one meter body. The Honeywell Elster Q.Sonic^plus 6-path (two single and four double reflection paths) for the fiscal measurement and the CheckSonic 2-path (two single reflection paths) for the "check" measurement. Each measurement has its own independent series 6 signal processing unit (SPU) with color graphic touch screen display.

The Honeywell Elster TwinSonic^plus provides additional measurement confidence by offering an internal pressure and temperature sensors for a more accurate calculation of Reynolds number and dynamic body correction. This ensures a repeatable and accurate flow measurement, even when process conditions vary or differ from calibrated conditions. Encrypted data is managed by the Real Time Operating System (RTOS) philosophy pioneered by Green Hills Software. Integrity RTOS provides one of the most reliable operating platforms in the world delivering peace of mind with the highest security level that is currently achievable for a real-time operating system.

SonicExplorer,® a PC-based software package, for the operator, service technician and engineering world is used to configure, diagnose and monitor the TwinSonic^plus flow meter either locally or remotely. One of the unique features of SonicExplorer is the "Generate a Customer Service Package." In the event that warning or alarm is generated, the operator can initiate SonicExplorer to immediately collect a log containing the entire state of the ultra-sonic flow meter including all diagnostics, configuration and spectral noise analysis. The Customer Service Package is automatically compressed, and directed to a preselected e-mail recipient for support at Elster or engineer/technician of your choice.

FEATURES & BENEFITS

Main Features
- Two totally independent flow meters in one meter body providing fiscal measurement with verification.
- Sizes 10" to 36"—larger sizes available upon request (DN 250 to DN 900)
- Pressure ratings ANSI class 150 to 900, PN on request
- Titanium-encapsulated, intrinsically safe transducers
- Internal temperature sensor
- Flow profile detection with swirl and asymmetry measurement
- Diagnostic detection of liquid and dirt build-up
- No moving parts
- No pressure drop
- Bi-directional measurement
- SonicExplorer PC Software for configuration, diagnostics and health care
- OIML R137-1 compliant (fiscal meter)
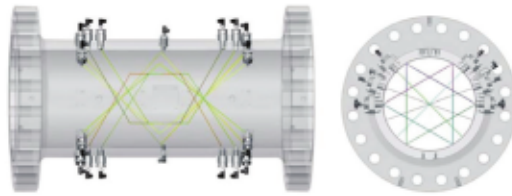- AGA 9 compliant
- MID approved (fiscal meter).

Applications
- Custody transfer measurement of natural gas
- Gas exploration, transmission and distribution.

Options
- VDSL range extender for high-speed long distance TCP/IP communication
- Pressure sensors for Reynolds corrections
- Retraction tool for transducer exchange "under pressure."

Path Configuration

The TwinSonic^plus is a combination of the Q.Sonic^plus and the CheckSonic 2-path in one meter body. The Q.Sonic^plus uses two pairs of double and two single reflection paths. Taking the mean value of both pairs will result in a symmetrically weighted measurement. The subtraction of the paired paths provides an indication of asymmetric flow along the mirror plane of the paths as an additional diagnostic feature.

The two paths CheckSonic uses two single reflection paths for verification of this primary measurement.

Model NG Ultrasonic Transducers

The NG transducers are fully encapsulated within a titanium body, providing optimum protection in harsh or aggressive environments. The Titanium body also offers a smooth surface that abates dirt and grime build-up and also offers isolation during rapid depressurisation. The NG transducers operate over an optimised frequency range ensuring exceptional balance between measurement resolution and signal attenuation.

Transducer Path No.	
Q.Sonic^plus	Path Type
1	Double reflection path
2	Double reflection path
3	Single reflection path
4	Single reflection path
5	Double reflection path
6	Double reflection path
CheckSonic 2-path	Path type
7	Single reflection path
8	Single reflection path

Signal Processing Unit (SPU) Series 6

The signal processing unit (SPU) is a modular design to allow for future expansion and resides in flame-proof cast aluminium alloy housing. Field connections are located in a segregated back compartment of the SPU housing where the terminal board and the optional VDSL range extender reside.
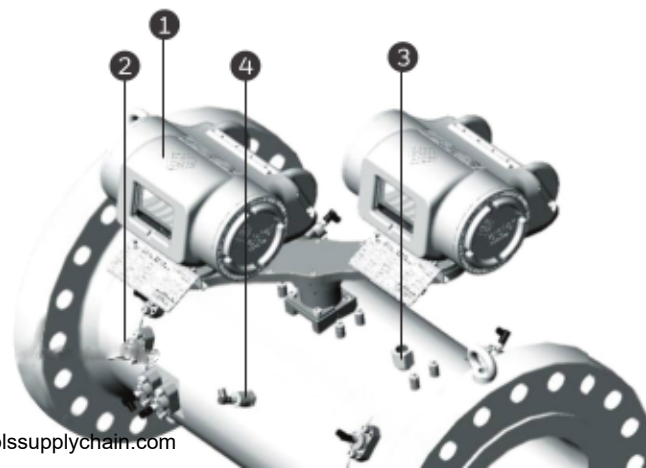
The colour 'touch sensitive' graphic user interface allows easy local monitoring of flow meter operation, diagnostics and performance. When connecting the two SPU's via a serial or Ethernet link an online VoS and flow verification between the two measurements can be performed. This comparison features can be used to trigger alarms if the flow and/or VoS between the two systems vary by more than the defined limits. With this integrated diagnostics the SPU's are monitoring each other. Extended operational data and diagnostics can be sent over networks via a built-in web server. The series 6 electronics boast an enCore central processing unit with max. 32 GB storage capacity that enables mandated, user-configurable

data archives, event logging, as well as historic data to be placed at your fingertips.

Components on the Meter Body

❶ Two Independent Signal Processing Units (SPU's) with interactive touch screen displays

❷ Integral Mounting plate to facilitate 'online, under pressure' transducer removal

❸ Two pressure taps for external transmitters located on the meter body

❹ Integral temperature and optional pressure sensor for a more accurate calculation of Reynolds and body correction.

Flow Ranges Metric

Type	Size		Flange Connection		Spool Diameter		Internal	Flow [m³/h]			Turndown
	[Inch]	DN	ANSI Schedule	EN1092-1	ANSI Flange Max ID [mm]	PN Flange Max ID [mm]	Diameter [mm]	Q_{min}	Q_t	Q_{max}	
Reduced Bore Fixed Inner Diameter	10	250	STD-80 80-120	PN 10- PN 100	254.50 242.80	260.40	240 230	48 44	590 540	5900 5400	123 123
	12	300	30-60 60-100	PN 10- PN 100	307.00 295.30	309.70	295 280	73 66	860 780	8600 7800	118 118
	14	350	30-60 60-100	PN 10- PN 100	336.50 325.40	341.40	325 305	85 75	1000 900	10000 9000	118 120
	16	400	30-60 60-100	PN 10- PN 100	387.30 373.00	392.20	370 350	115 100	1300 1150	13000 11500	113 115
Full Bore Customized	18	450	STD 120	PN 10- PN 40		442.80	Max. 437.90 Min. 387.10	165 120	1800 1350	18000 13500	109 113
	20	500	STD 120	PN 10- PN 100		493.80	Max. 488.90 Min. 431.80	200 160	2100 1600	21000 16000	105 100
	24	600	STD 100	PN 10- PN 63		594.00	Max. 590.90 Min. 532.22	295 240	3000 2400	30000 24000	102 100
	26	650	STD S = 25.4	n/a			Max. 640.90 Min. 609.20	330 275	3300 2750	33000 27500	100 100
	30	750	STD S = 31.75	n/a			Max. 742.90 Min. 730.30	460 370	4600 3700	46000 37000	100 100
	36	900	STD S = 31.75	PN 10- PN 63		889.00	Max. 894.90 Min. 850.50	670 525	6700 5250	67000 52500	100 100
	42	1050	STD S = 31.75	n/a			Max. 1047.90 Min. 1003.50	920 750	8300 6750	83000 67500	90 90
	48	1200	STD S = 31.75	PN 10- PN 63		1194.00	Max. 1199.90 Min. 1155.50	1200 1000	11000 9100	110000 91000	92 91
	56	1400	S = 12.7 S = 31.75	PN 10- PN 40		1393.60	Max. 1396.60 Min. 1358.50	1650 14300	15000 14300	150000 89	91 89

Flow Ranges Imperial

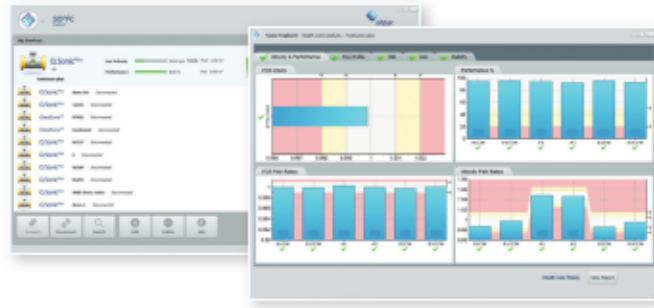| Type	Size		Flange Connection		Spool Diameter		Internal	Flow [MC FD]			Turndown
	[Inch]	DN	ANSI Schedule	EN1092-1	ANSI Flange Max ID [inch]	PN Flange Max ID [inch]	Diameter [inch]	Q_{min}	Q_t	Q_{max}	
Reduced Bore Fixed Inner Diameter	10	250	STD-80 80-120	PN 10- PN 100	10.02 9.56	10.25	9.45 9.06	41 37	500 458	5001 4577	123 123
	12	300	30-60 60-100	PN 10- PN 100	12.09 11.63	12.19	11.61 11.02	62 56	729 661	7289 6611	118 118
	14	350	30-60 60-100	PN 10- PN 100	13.25 12.81	13.44	12.80 12.01	72 74	848 763	8476 7628	118 120
	16	400	30-60 60-100	PN 10- PN 100	15.25 14.69	15.44	14.57 13.78	97 85	1102 975	11018 9747	113 115
Full Bore Customized	18	450	STD 120	PN 10- PN 40		17.43	Max. 17.24 Min. 15.24	140 102	1526 1144	15256 11442	109 113
	20	500	STD 120	PN 10- PN 100		19.44	Max. 19.25 Min. 17	170 136	1780 1356	17799 13561	105 100
	24	600	STD 100	PN 10- PN 63		23.39	Max. 23.26 Min. 20.95	250 203	2543 2034	25427 20341	102 100
	26	650	STD S = 25.4	n/a			Max. 25.23 Min. 23.98	280 233	2797 2331	27969 23308	100 100
	30	750	STD S = 31.75	n/a			Max. 29.25 Min. 28.75	390 314	3899 3136	38987 31359	100 100
	36	900	STD S = 31.75	PN 10- PN 63		35.00	Max. 35.23 Min. 33.48	568 445	5679 4450	56786 44496	100 100
	42	1050	STD S = 31.75	n/a			Max. 41.26 Min. 39.51	780 636	7035 5721	70347 57210	90 90
	48	1200	STD S = 31.75	PN 10- PN 63		47.01	Max. 47.24 Min. 45.49	1017 848	9323 7713	93231 77127	92 91
	56	1400	S = 12.7 S = 31.75	PN 10- PN 40		54.87	Max. 54.98 Min. 53.48	1398 1356	12713 12120	127133 121200	91 89

For MID approved sizes and flow ranges, please also refer to the latest EC Type- examination Certificate 110335.

SonicExplorer

SonicExplorer is a Windows*-based PC software for on-site and remote communication with the TwinSonic^plus flow meter. This also enables off-line data analysis and flow meter pre-commissioning configuration. SonicExplorer is a tool that allows the end-user to view the health and performance of the meter either in real time or from historical archives. SonicExplorer focuses on providing intuitive yet detailed data so that informed decisions can be made with respect to maintenance and recalibration.

Function overview

– Health care reporting
– Customer Service Package
– Real time and historical diagnostics analysis
– Multiple meter database
– Fingerprint reference cases
– Spectral noise analysis
– Configuration capability
  (if security features are deactivated)
– Configuration documentation

TwinSonic^plus Technical Specifications

Technical Data	
Measurement Principle	Ultrasonic transit time measurement
Sizes	10" to 36"—larger sizes available upon request (DN 250 to DN 900)
Pressure Range	8 bar [g] (116 psi [g]) to 150 bar [g] (2175 psi [g]); minimum pressure depending on size and gas composition
Process Temperature Range [5]	Standard: -40°C to +80°C (-40°F to +176°F) Extended: -50°C to +80°C (-58°F to +176°F)
Ambient Temperature Range [5]	Standard: -40°C to +85°C (-40°F to +185°F) Extended: -50°C to +85°C (-58°F to +185°F)
Repeatability	0.1% [1]
Typical Uncertainty	0.5% of reading after dry calibration [2] 0.2% of reading after flow calibration [2] 0.1% of reading after flow calibration and linearization [2] 0.5-1% depending on application [3]
Body Materials	Low-temperature carbon steel ≤ 12": ASTM A350-LF2 Cl.1 ≥ 14": ASTM A333 grade 6/ASTM A350-LF2 Cl.1 Stainless steel ≤ 12": ASTM A182-F316 ≥ 14": ASTM A312-TP316L/ASTM A182-F316L Other materials on request
Body Construction Details	≤ 16": reduced bore, 7° tapered inlet (forged) ≥ 18": full bore (machined and welded)
Material Certificate	EN 10204 3.1 (3.2 on request)
Pressure Reference Point	½" NPT (G½ on request)
Electronic Enclosure Material	Copper free aluminium, stainless steel (optional)
Power Supply	Nominal 24 V DC (18-30 V DC), 10-20 W (depending on installed optional cards)
Local Display	GUI, 4.3" widescreen graphical colour display with 7 capacitive soft keys (touch)
Interfaces	- 2 serial ports (RS 232/485 configurable) - 1 Ethernet port/high speed VDSL (VDSL option replaces Ethernet port) - 2 frequency outputs, 0 to 3 kHz - 2 digital outputs [4] - 2 analogue outputs [4] - 1 USB port (device)
Communications Protocol	- Modbus (ASCII, RTU, TCP/IP) - UNIFORM - MMS (Manufacturing Message Specification) - Built-in web server
Metrological Approval	MID T10335 (optional for primary measurement only)
MID Accuracy	Class 1.0
Hazardous Area Approvals	ATEX: Ex II 2 G Ex d ia [ia] IIB+H2 T6 Gb IECEx: Ex d ia [ia] IIB+H2 T6 Gb FM: Class I, Division 1, Group A to D T6 CSA: Class I, Division 1, Groups B, C and D T6; Ex d ia [ia] IIB+H2 T6 optional for primary measurement only
Ingress Protection	IP66 /NEMA Type 4X

[1] Q_t to Q_{max}—dry and uncontaminated gas
[2] For QSonic^plus Q_t to Q_{max} with straight inlet/outlet spool of 10D/3D
[3] For CheckSonic Q_t to Q_{max} with Flow conditioner, straight inlet/outlet spool of 10D/3D

[4] Analogue outputs and digital outputs sharing the terminal clamps
[5] Ranges: subject to application and (hazardous area) approval