

# CheckSonic<sup>VX</sup>

Multi-path ultrasonic gas meter  
for upstream, shale and harsh environments

## Applications

Shale gas gathering points, coal seam, flare, wellhead and other harsh environment applications

## Brief information

CheckSonic<sup>VX</sup> is a robust, durable, easy to operate and maintain platform for shale and unconventional gas, transmission gas and processed gas applications.

CheckSonic<sup>VX</sup> is a multipath ultrasonic gas flow meter utilizing the most robust acoustic path configurations available to the market. The CheckSonic<sup>VX</sup> employs durable transducer design with extended diagnostic functionality and capability to measure regardless of extensive liquid and dirt contamination found in typical shale gas gathering points, coal seam applications, flare and wellhead measurements. This robustness brings operational confidence to the end user of a reliable and superior measurement.

The 6 path configuration is a fully symmetrical layout of two direct cross pairs X paths in the same plane and two diametrical axial V bounce diagnostics paths. This V-X configuration provides highest measurement durability along with highly informative process diagnostics.

The CheckSonic<sup>VX</sup> proves its vital connection between the process and the operators by sampling the gas stream up to 30 times per second and per path to create an accurate image of the flowing profile. The operational diagnostics continuously monitor the presence of liquid or dirt build up in the meter body indicating if the meter should be taken out of service for maintenance or cleaning.

The CheckSonic<sup>VX</sup> provides additional measurement confidence by offering an internal pressure and temperature sensors for a more accurate calculation of Reynolds and Mach number resulting in 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 piece 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 CheckSonic<sup>VX</sup> flow meter either local or remote. One of the unique features of SonicExplorer is the "create customer service pack". At the sign of any warning or alarm the operator can initiate SonicExplorer to immediately collect a log containing the entire state of the ultrasonic flow meter including all diagnostics, configuration and spectral noise analysis. The customer service pack is automatically compressed, and directed to a preselected e-mail recipient for support at Elster or Engineer/Technician of your choice.

\* depending on meter size and medium



## Main features

- 6-path, direct and reflective technology (3 path optional)
- Sizes 4" to 56" (DN 100 to DN 1400)
- Operational pressure range 1 bar (g)\* to 150 bar (g)
- Pressure ratings: ANSI class 150 to 900 PN on request
- All titanium-encapsulated intrinsically safe transducers
- Robust path design for wet and dirty gas applications
- Turbulence and asymmetry detection
- Diagnostic detection of liquid and dirt build up
- No moving parts
- No pressure drop
- Symmetrical, bidirectional measurement (6 path)
- SonicExplorer® PC Software for configuration, diagnostics and health care
- AGA 9 compliant

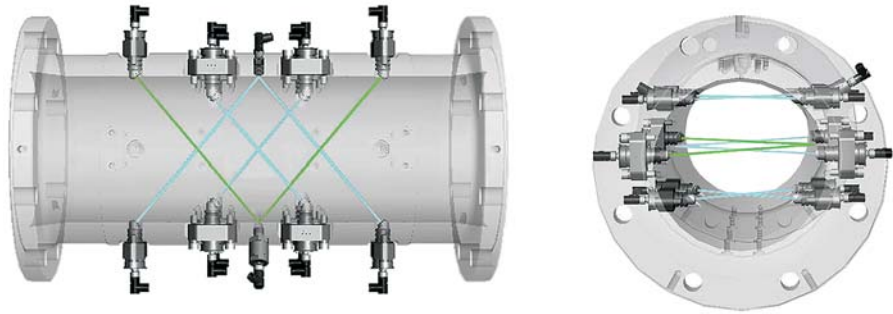
## Options

- VDSL modem for high speed long distance TCP/IP communication
- Pressure sensors for Reynolds and Mach corrections
- Retraction tool for transducer exchange 'under pressure'
- Reduced bore



### Path configuration

The CheckSonic<sup>vx</sup> 6 path uses two pairs of direct cross X paths in the same plane and two axial diameter single reflection V paths delivering a sophisticated acoustic imaging and interrogation of the gas stream.



The reflective V paths interrogating the centre of the flow are sensitive indicators and enable the meter to be the “first to detect” dirt and grime deposited by process in the meter body. Conversely the direct paths provide extremely robust measurement under dramatic operating conditions typically seen in shale gas gathering points, coal seam, flare, wellhead and other harsh applications.

Transducer path		
Path No.		Path type
6 path	3 path	
1	1	Direct cross path
2	2	Direct cross path
3	3	Single reflection path
4	-	Single reflection path
5	-	Direct cross path
6	-	Direct cross path

### Model NG ultrasonic transducers

The NG transducers are fully encapsulated within a titanium body for robust operation from atmospheric applications to extended process pressures. The titanium body also offers a smooth surface that abates dirt and grime build-up. The NG transducers operate over a range of 200 kHz ensuring exceptional balance between measurement resolution and signal strength.

### Signal processing unit (SPU) series 6

The signal processing unit (SPU) resides in a flame-proof cast aluminium alloy housing mounted in a slotted card cage with room for future expansion. Field connections are located in a segregated back compartment of the SPU housing, where the terminal board and the optional VDSL modem reside.

The colour graphics touch user interface allows easy monitoring of flow meter operation, diagnostics and performance for a detailed analysis of meter health. Extended operational data and diagnostics can be sent to networks and PC's via a built in web server. The series 6 electronics boast an enCore central processing unit with 32 GB storage memory, which enables mandated, user configurable data archives, event logging as well as historic data at your fingertips.



### Components on the meter body

- Signal processing unit (SPU) electronics and interactive touch screen
- Pressure tap for external transmitter located on the meter body.
- Temperature and optional pressure sensor for a more accurate calculation of Reynolds and Mach number correction
- Transducer and mounting plate with retractable transducer under process conditions; optional mechanical extraction tool



Flow ranges metric											
Type	Size		Flange connection		Spool diameter		Internal diameter [mm]	Q <sub>min</sub>	Flow [m <sup>3</sup> /h]		Turndown
	[Inch]	DN	ANSI schedule	EN1092-1	ANSI flange max ID [mm]	PN flange max ID [mm]			Q <sub>t</sub>	Q <sub>max</sub>	
Full bore Customized	4	100	STD – XS	PN 10 – PN 100	102.30	107.10	97	13	100	1000	79
	6	150	STD – XS XS – 120	PN 10 – PN 100	154.10 146.30	159.30	146 139	18 16	220 200	2200 2000	124 125
	8	200	STD – XS XS – 120	PN 10 – PN 100	202.70 193.70	206.50	190 180	30 27	400 350	4000 3500	133 130
	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
	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 1600	15000 14300	150000 143000	91 89

Flow ranges imperial											
Type	Size		Flange connection		Spool diameter		Internal diameter [inch]	Q <sub>min</sub>	Flow [MC F D]		Turndown
	[Inch]	DN	ANSI schedule	EN1092-1	ANSI flange max ID [inch]	PN flange max ID [inch]			Q <sub>t</sub>	Q <sub>max</sub>	
Full bore Customized	4	100	STD – XS	PN 10 – PN 100	4.03	4.22	3.82	11	85	848	79
	6	150	STD – XS XS – 120	PN 10 – PN 100	6.07 5.76	6.27	5.75 5.47	15 14	186 170	1865 1695	124 125
	8	200	STD – XS XS – 120	PN 10 – PN 100	7.98 7.63	8.13	7.48 7.09	25 23	339 297	3390 2966	133 130
	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
	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

## Sonic Explorer

SonicExplorer is a Windows-based PC software for on-site and remote communication with the CheckSonic<sup>vx</sup> flow meter as well as 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 pack
- Real time and historical diagnostics analysis
- Multiple meter data base
- Fingerprint reference cases
- Spectral noise analysis
- Configuration capability  
(if security features are deactivated)
- Configuration documentation



Technical data	
Measurement principle	Ultrasonic transit time measurement
Sizes	4" to 56" (DN 100 to DN 1400)
Pressure range	1 bar(g), (14.5 psig) to 150 bar(g) , (2175 psig), minimum pressure depending on size and gas composition
Process temperature range	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	Standard: -40 °C to +60 °C (-40 F to +140 F) Extended: -50 °C to +80 °C (-58 F to +140 F)
Repeatability	0.1% <sup>1)</sup>
Typical uncertainty	0.5 – 1 % depending on the application <sup>1)</sup>
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, tapering angle 7° (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
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 <sup>2)</sup> - 2 analogue outputs <sup>2)</sup> - 1 USB port (device)
Communications protocol	- Modbus (ASCII, RTU, TCP/IP) - UNIFORM - MMS (Manufacturing Message Specification) - Built-in web server
Hazardous area approvals	ATEX: Ⓜ 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
Ingress protection	IP66 /NEMA 4X

<sup>1)</sup> Q<sub>i</sub> to Q<sub>max</sub> – dry and uncontaminated gas

<sup>2)</sup> Analogue outputs and digital outputs sharing the terminal clamps

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