

Q.SONIC[®]PLUS

Multi-Path Ultrasonic Gas Meter for Custody Transfer Measurement

BRIEF INFORMATION

The ultrasonic gas flow meter Q.Sonic-plus is a six-path meter covered by an 'enhanced' Elster-Instromet patent, with extended functionality, bringing about new benefits for the end user, along with greater processing power that yields a lower measurement uncertainty.

The patented path configuration—a fully symmetrical layout of four swirl paths with double reflection and two single reflection paths—enables the measurement of both swirl and asymmetry, resulting in previously unequaled profile recognition and diagnostic possibilities.

Another innovation of the Q.Sonic-plus is that it can be equipped with an internal pressure and temperature measurement function. This means that the device measures both the gas pressure and temperature of the measuring tube. On the one hand, these measurements allow for a more accurate calculation of the Reynolds number for the flow profile analysis and on the other, they can be used to correct the meter body diameter and path geometry. This is useful if the process conditions vary widely, since both high pressure and high temperatures result in an increase in the tube crosssection and a change in path lengths and angles.

Honeywell Process Solutions has an ISASecure[®] certified Security Development Lifecycle Assurance (SDLA) Program. In compliance to ANSI/ISA-62443-4-1-2018 as well as IEC 62443-4-1:2018 our state of the art updated Cyber Security Package with Transport Layer Security (TLS), encryption of parameterization data and separated sensitive data encryption was introduced in our Q.Sonic-plus starting with Firmware 3.40A.

The electronics are located in a flame-proof housing with a separate connection compartment for field wiring. Thanks to its modular hardware design with a free slot, the device is also prepared to tackle future requirements. For user operation the system is equipped with a graphical user interface with touch screen functionality.

EnSuite supports during commissioning and configuration for a huge variety of Honeywell products, including the Q.Sonic series.

The simple and intuitive user interface enables to easily configure, diagnose, and monitor the Q.Sonic-plus flow meter either local or remote.

Furthermore, customers are able to manage the Q.Sonic-plus including secondary measurements optimally with Measurement-IQ (MIQ), receive actionable insights for intelligent autonomous operations and enhanced safety, reliability and efficiency.



MAIN FEATURES

- 6-path reflective technology
- Sizes 3" to 24" (DN 80 to DN 600)—larger sizes available upon request till 56"
- Pressure ratings: ASME 300 / 600 (150/900/1500/PN on request)
- All-titanium-encapsulated intrinsically safe transducers
- Internal temperature sensor
- Flow profile detection with swirl and asymmetry measurement
- No moving parts
- No pressure drop
- Bi-directional measurement
- EnSuite PC software for configuration, diagnostics and healthcare
- OIML R137-1 (2014) compliant
- ISO 17089-1 (2019) compliant
- AGA 9 (2022) compliant
- MID approved

Options

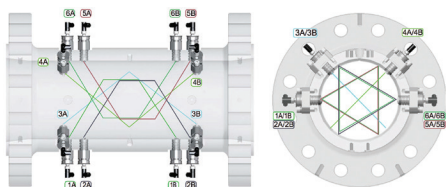
- SHDSL high-speed communication via Ethernet Range Extender (ERE)
- Pressure sensor for reynolds and geometrical correction
- Retraction tool for transducer exchange 'under pressure'
- Stainless Steel SPU enclosure

Applications

- Custody transfer measurement of natural gas
- Gas exploration, transmission and distribution
- Non-custody transfer measurement of gas
- Other gases on request

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PATH CONFIGURATION



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.

ULTRASONIC TRANSDUCERS MODEL NG

The transducers are all-metal encapsulated with titanium, which offers a smooth surface to minimize contamination. The ultrasonic frequency of 200 kHz ensures a good balance between resolution and attenuation/propagation of the signal.

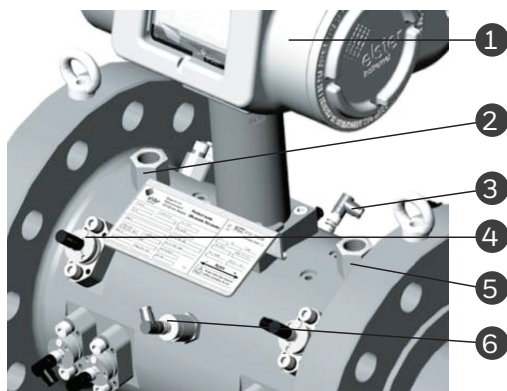
TRANSDUCER PATH

Path No.	Path Type
1A/1B	Swirl path (B1-CW*)
2A/2B	Swirl path (B1-CCW**)
3A/3B	Axial path (A1)
4A/4B	Axial path (A2)
5A/5B	Swirl path (B2-CW)
6A/6B	Swirl path (B2-CCW)

* Clockwise

** Counter-clockwise

COMPONENTS ON THE METER BODY



- 1 Signal processing unit (SPU)
- 2 Pressure connection point for external transmitter
- 3 Temperature sensor for meter body temperature
- 4 Transducer with mounting bracket, prepared for retraction under pressure
- 5 Second pressure connection point
- 6 Optional pressure sensor for geometry correction and line density estimation (profile correction)

SIGNAL PROCESSING UNIT (SPU) SERIES 6



The SPU electronic resides in a flame-proof housing with a separate compartment for the terminal connections. The boards are mounted in a card cage with one free slot for future extensions.

A color graphic screen with 7 touch-sensitive sections allows easy operation by using a menu structure to access the data. Thanks to the built-in web server, this can also be done remotely when a network connection is available. The heart of the system is the EnCore with up to 16 GB of data memory.

Diagnostic and self-checking functions in conjunction with a flexible, user-configurable data archive and an event list allow a detailed analysis of the meter's performance and the metering situation at any time.

ENSUITE®

The Windows® application EnSuite supports during commissioning and configuration for a huge variety of Honeywell products, including the Q.Sonic series starting with FW3.40 release. The simple and intuitive user interface enables the devices to be installed quickly. In addition to the device configuration, EnSuite also supports the remote operation panel, the readout and display functions as well as many other practical functions which feature on Elster devices. EnSuite is available for free download from the Honeywell Elster website and will run in Windows 7 and Windows 10.

FLOW RANGES METRIC - STANDARD METERS (FIXED DIAMETER TAPERED TO ANSI SCH 40/60/80)														
Size		Internal Standard Diameter [mm]	Flow range according to MID:2014 [m³/h]				Flow range according to ISO 17089:2019 & OIML R137:2012 class 1 [m³/h]				Flow range according to AGA9:2022 [m³/h]			
[Inch]	DN		Q _{min}	Q _t	Q _{max}	Turndown	Q _{min}	Q _t	Q _{max}	Turndown	Q _{min}	Q _t	Q _{max}	Turndown
3	80	73 70	11 10	100 92	500 460	45 46	11 10	59 54	600 550	55 55	15 14	59 54	600 550	40 39
4	100	97 90	13 11	104 89	883 760	68 69	13 11	104 89	1000 900	77 82	24 21	104 89	1000 900	42 43
6	150	146 139	18 16	211 191	2001 1814	111 113	18 16	211 191	2200 2000	122 125	45 41	211 191	2200 2000	49 49
8	200	190 180	30 27	321 357	3389 3041	113 113	30 27	357 321	3900 3500	130 130	61 55	357 321	3900 3500	64 64
10	250	240 230	48 44	570 523	5407 4966	113 113	48 44	570 523	5900 5400	123 123	80 75	570 523	5900 5400	74 72
12	300	295 280	73 66	861 776	8169 7359	112 112	73 66	861 776	8600 7800	118 118	125 110	861 776	8600 7800	69 71
16	400	370 350	115 100	1285 1150	12851 11499	112 115	115 100	1239 1108	13000 11500	113 115	135 120	1239 1108	13000 11500	96 96
20	500	477,8 466,8 455,6	194 185 176	2007 1916 1825	20075 19161 18252	103 103 103	194 185 176	1936 1848 1761	20075 19161 18252	103 104	194 185 176	1936 1848 1761	20075 19161 18252	104 104
24	600	574,6 560,4 547,7	280 266 254	2838 2699 2578	28379 26994 25784	101 101 101	280 266 254	2801 2664 2544	28379 26994 25784	101 101	280 266 254	2801 2664 2544	28379 26994 25784	101 101

*The available standard diameters will be tapered to meet ANSI schedule 40/60/80. Others on request

FLANGE RATING ANSI 150 METRIC								
Meter Size [inch]	Meter Size [mm]	Dimensions [mm]				Forged body Material	Weight [kg]	Length
		A	B	C	L			
3"	DN 80	517	422	147	320	LTCS	50	4D
4"	DN 100	546	431	153	400	LTCS	65	4D
6"	DN 150	570	430	184	450	LTCS	95	3D
8"	DN 200	625	452	205	600	LTCS	150	3D
10"	DN 250	680	477	252	750	LTCS	220	3D
12"	DN 300	747	505	280	900	LTCS	330	3D
14"	DN 350	802	535	310	1050	LTCS	470	3D
16"	DN 400	859	561	336	1200	LTCS	560	3D
18"	DN 450	903	586	331	1350	LTCS	715	3D
20"	DN 500	961	611	356	1500	LTCS	905	3D
24"	DN 600	1069	662	407	1800	LTCS	1385	3D

FLANGE RATING ANSI 300 METRIC								
Meter Size [inch]	Meter Size [mm]	Dimensions [mm]				Forged body Material	Weight [kg]	Length
		A	B	C	L			
3"	DN 80	527	422	147	320	LTCS	55	4D
4"	DN 100	558	431	153	400	LTCS	75	4D
6"	DN 150	589	430	184	450	LTCS	110	3D
8"	DN 200	643	452	205	600	LTCS	170	3D
10"	DN 250	700	477	252	750	LTCS	255	3D
12"	DN 300	765	505	280	900	LTCS	370	3D
14"	DN 350	827	535	310	1050	LTCS	515	3D
16"	DN 400	884	561	336	1200	LTCS	645	3D
18"	DN 450	941	586	356	1350	LTCS	825	3D
20"	DN 500	999	611	388	1500	LTCS	1035	3D
24"	DN 600	1120	662	457	1800	LTCS	1590	3D

FLANGE RATING ANSI 600 METRIC								
Meter Size [inch]	Meter Size [mm]	Dimensions [mm]				Forged body Material	Weight [kg]	Length
		A	B	C	L			
3"	DN 80	527	422	147	320	LTCS	60	4D
4"	DN 100	568	431	153	400	LTCS	85	4D
6"	DN 150	608	430	185	500	LTCS	135	3.33D
8"	DN 200	662	452	210	600	LTCS	205	3D
10"	DN 250	731	477	254	750	LTCS	320	3D
12"	DN 300	784	505	280	900	LTCS	430	3D
14"	DN 350	837	535	310	1050	LTCS	575	3D
16"	DN 400	903	561	343	1200	LTCS	740	3D
18"	DN 450	957	586	372	1350	LTCS	930	3D
20"	DN 500	1018	611	407	1500	LTCS	1200	3D
24"	DN 600	1132	662	470	1800	LTCS	1800	3D

FLANGE RATING ANSI 900 METRIC								
Meter Size [inch]	Meter Size [mm]	Dimensions [mm]				Forged body Material	Weight [kg]	Length
		A	B	C	L			
3"	DN 80	542	422	147	320	LTCS	65	4D
4"	DN 100	576	431	153	400	LTCS	95	4D
6"	DN 150	620	430	190	600	LTCS	170	4D
8"	DN 200	687	452	235	800	LTCS	285	4D
10"	DN 250	750	477	273	750	LTCS	365	3D
12"	DN 300	810	505	305	900	LTCS	515	3D
14"	DN 350	856	535	321	1050	LTCS	660	3D
16"	DN 400	913	561	323	1200	LTCS	810	3D
18"	DN 450	980	586	394	1350	LTCS	1065	3D
20"	DN 500	1040	611	429	1500	LTCS	1355	3D
24"	DN 600	1183	662	521	1800	LTCS	2280	3D

FLANGE RATING ANSI 1500 METRIC								
Meter Size [inch]	Meter Size [mm]	Dimensions [mm]				Forged body Material	Weight [kg]	Length
		A	B	C	L			
3"	DN 1500	555	422	147	400	LTCS	82	5D
4"	DN 1500	586	431	155	500	LTCS	122	5D
6"	DN 1500	628	430	198	600	LTCS	207	4D
8"	DN 1500	695	452	243	800	LTCS	347	4D
10"	DN 1500	770	477	293	1000	LTCS	517	4D
12"	DN 1500	842	523	338	1200	LTCS	783	4D
14"	DN 1500	898	543	375	1400	LTCS	1100	4D
16"	DN 1500	956	561	413	1600	LTCS	1509	4D
18"	DN 1500	1033	576	458	1800	LTCS	1951	4D
20"	DN 1500	1090	597	493	2000	LTCS	2558	4D
24"	DN 1500	1247	662	585	2400	LTCS	4332	4D

FLOW RANGES METRIC - HIGHEST/LOWEST FLOWRANGE PER METER SIZE

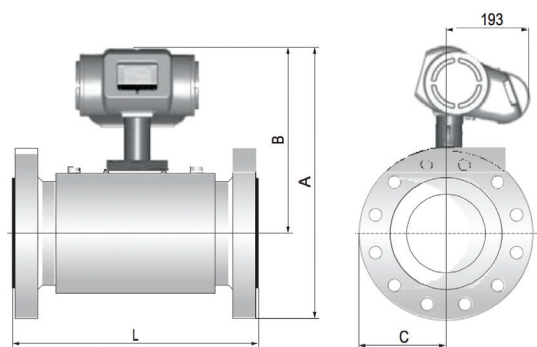
Size		Flange Connection		Spool Diameter		Max./Min. Internal Diameter as per type approval** [mm]	Q _{min}	Q _t	Q _{max}
[Inch]	DN	ANSI Schedule	EN1092-1	ANSI Flange Max ID [inch]	PN Flange Max ID [inch]				
3	80	STD-XS XS-160	PN 10-PN 100	77.90 73.70	82.50	80 70	13 10	71 54	601 460
4	100	STD-XS XS-120	PN 10-PN 100	102.30 97.20	107.10	105 80	16 9	122 71	1035 601
6	150	STD-XS XS-120	PN 10-PN 100	154.10 146.30	159.3	155 130	20 14	238 167	2255 1586
8	200	STD-XS XS-120	PN 10-PN 100	202.70 193.70	206.50	210 180	37 27	436 321	4140 3041
10	250	STD-80 80-120	PN 10-PN 100	254.50 242.80	260.40	260 230	57 45	669 523	6346 4966
12	300	30-60 60-100	PN 10-PN 100	307.00 295.30	309.70	320 270	87 62	1013 721	9612 6843
14	350	30-60 60-100	PN 10-PN 100	336.50 325.40	341.40	345 300	101 76	1077 814	11173 8448
16	400	30-60 60-100	PN 10-PN 100	387.30 373.00	392.20	395 350	132 104	1412 1108	14646 11499
18	450	STD 120	PN 10-PN 40		442.80	440 380	164 122	1752 1307	17900 13351
20	500	40 60 80	PN 10-PN 100	488.90* 431.80*	493.80	490 430	204 157	2037 1568	21113 16259
24	600	40 60 80	PN 10-PN 63	590.90* 532.22*	594.00	595 520	300 229	3003 2294	30430 23242
26	650	STD S = 25.4	n/a			645 570	353 276	3529 2756	35524 27743
30	750	STD S = 31.75	n/a			745 660	471 369	4708 3695	47079 36949
36	900	STD S = 31.75	PN 10-PN 63		889.00	895 780	679 516	6795 5161	67945 51606
42	1050	STD S = 31.75	n/a			1045 940	926 749	8337 6745	83675 67704
48	1200	STD S = 31.75	PN 10-PN 63		1194.00	1195 1090	1211 1008	10902 9070	110228 91708
56	1400	S = 12.7 S = 31.75	PN 10-PN 40		1393.60	1400 1370	1663 1592	14963 14328	150736 144345

**The maximum/minimum diameter will influence several parameters of the Ultrasonicmeter (flowranges, pulses, etc.). Therefore, please reach out to your local sales and proposal team


Material specifications ANSI 150-1500 (Forged body)

LTCS Forging	ASTM A350-LF2 Cl.1 - 18
Stainless Steel	ASTM A182-F316 - 22a / ASTM A182-F316L - 22a dual certified
ANSI flanges up to 24" (DN600) are as per ASME 16.5	
3.1 Material certificate as per EN10204; On request: 3.2 Material certificate as per EN10204, PMI (Positive Material Identification), NACE	

LTCS: Low Temperature Carbon Steel. Other Materials on Request.



Q.Sonic^{plus} Technical Specifications

TECHNICAL DATA						
Measurement Principle	Ultrasonic transit time measurement					
Sizes	3" to 24"— larger sizes available upon request (DN 80 to DN 600) till 56"					
Pressure range	Meter size	Pmin (barg)	These minimum operating pressures are applicable for "standard natural gas", which is defined as follows:			
	3"	4	For other gas-mixtures please reach out to evaluate the application and Pmin accordingly			
	4"	4	Component	Range	Component	Range
	6"	4	C1	0-95	He	0-3
	8"	4	N2	0-100	H2	0-10
	10"	5	CO2	0-1.5	CO	0-3
	12"	6	C2	0-100	Ar	0-1
	14"	7	C3	0-12	O2	0-21
	16"	8	C4	0-6	H2O	0-DewPoint
	20"	10	C5	0-4	H2S	0-100
	24"	12	C6+	0-DewPoint	Specific Gravity	0.55-1.5
Process Temperature Ranges ⁴⁾	Standard: -40°C to +60°C (-40°F to +140°F) Extended: -40°C to +80°C (-40°F to +176°F) ⁵				MID: -40°C to +55°C (-40°F to +131°F)	
Ambient Temperature Range ⁴⁾	Standard: -40°C to +60°C (-40°F to +140°F) Extended: -40°C to +55°C (-40°F to +131°F)				MID: -40°C to +55°C (-40°F to +131°F)	
Repeatability	≤0.05% ¹					
Typical Uncertainty	0.5% of measured flow rate after zero flow calibration ² 0.2% of measured flow rate after high-pressure flow calibration ²				0.1% of measured flow rate after high-pressure flow calibration and linearization ² 0.3% of measured flow rate after high-pressure flow calibration and linearization (as per AGA9) ¹	
Body Materials	Standard: LTCS (low-temperature carbon steel) ASTM A350-LF2 Cl.1 - 18 On request: ASTM A350-LF6 Cl. 1 - 18, ASTM A182-F316 - 22a / ASTM A182-F316L - 22a					
Material Certificate	Standard: 3.1 Material certificate as per EN 10204 On request: 3.2 Material certificate as per EN 10204, PMI (Positive Material Identification), NACE					
Body Construction Details	≤ 16": reduced bore, tapering angle 7°				≥ 18": full bore	
Pressure Reference Points	Standard connection point (≤4"): 1pcs ½" NPT				>4": 2pcs ½" NPT; others on request	
Electronic Enclosure Material	Signal Processing Unit (SPU) enclosure is made from casted aluminium. Stainless steel enclosure is available as option incl. 5 threaded entries for glands/stopping plugs					
Power Supply	Nominal 24 V DC (18-30 V DC), 10-20 W (depending on installed optional cards)					
Local Display	GUI, 4.3" (10.9 cm) widescreen graphical colour display with 7 capacitive soft keys (touch), LEDs for power and status					
Interfaces	• 2 serial ports (RS 232/485 configurable) • 1 Ethernet port;high-speed SHDSL board and extender available as option • 2 frequency outputs, 0 to 3kHz / 0 to 5kHz				• 2 digital outputs ³ • 2 analogue outputs 4-20mA NAMUR ³ • 1 USB port for service purpose only	
Communications Protocol	• Modbus (ASCII, RTU, TCP/IP) • UNIFORM • UNIFORM Series IV 4-path compatibility mode				• MMS (Manufacturing Message Specification) • Built-in web server • Transport Layer Security (TLS) encryption (with FW3.40A)	
Metrological Approval	MID T10335 (optional) ²					
MID Accuracy	Class 1.0					
Hazardous Area Approvals	ATEX:  Ex db ia [ia Ga] IIB+H2 T6 Gb IECEX: Ex db ia [ia Ga] IIB+H2 T6 Gb				FM: Class I, Division 1, Group A to D T6	
Ingress Protection	IP 66/NEMA Type 4X					

¹ Q_t to Q_{max}

² Q_t to Q_{max} with straight inlet/outlet spool of 3D/Nova50E/10D/USM/3D

³ Analogue outputs and digital outputs sharing the terminal clamps

⁴ Ranges: subject to application and (hazardous area) approval

⁵ If Process temperature is +80°C, ambient temperature is to be limited to +55°C

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THE
FUTURE
IS
WHAT
WE
MAKE IT

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