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

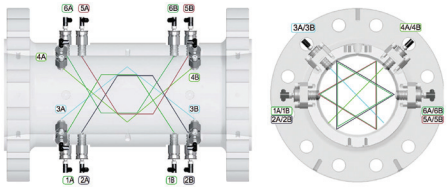
- SHDSL high-speed communication via Ethernet Range Extender (ERE)
- Pressure sensor for reynolds and geometrical correction
- Retraction tool for transducer exchange 'under pressure'
- Stainless Steel SPU enclosure

Applications

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

Honeywell

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

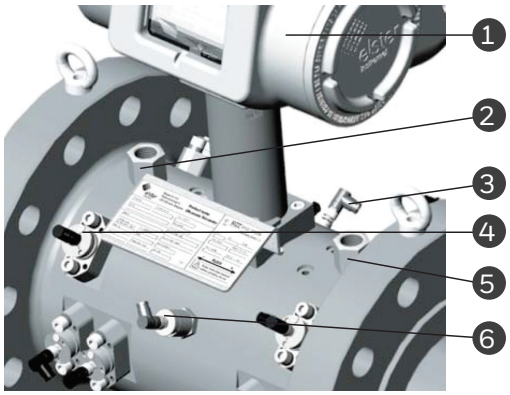
The transducers are all-metal encapsulated with titanium, which offers a smooth surface to minimize contamination. The ultrasonic frequency of 200 kHz ensures a good balance between resolution and attenuation/propagation of the signal.

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)

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.

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.

FLOW RANGES IMPERIAL - STANDARD METERS (FIXED DIAMETER TAPERED TO ANSI SCH 40/60/80)

Size		Internal Standard Diameter [inch]	Flow range according to MID:2014 [cft/h]				Flow range according to ISO 17089:2019 & OIML R137:2012 class 1 [cft/h]				Flow range according to AGA9:2022 [cft/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	2,87 2,76	388 353	3531 3249	17657 16245	45 46	388 353	3531 3249	21189 19423	55 55	530 494	3531 3249	21189 19423	40 39
4	100	3,82 3,54	459 388	3673 3143	31183 26839	68 69	459 388	3673 3143	35315 31783	77 82	848 742	3673 3143	35315 31783	42 43
6	150	5,75 5,47	636 565	7451 6745	77692 70629	111 113	636 565	7451 6745	77692 70629	122 125	1589 1448	7451 6745	77692 70629	49 49
8	200	7,48 7,09	1059 953	12607 11336	119682 107392	113 113	1059 953	12607 11336	137727 123601	130 130	2154 1942	12607 11336	137727 123601	64 64
10	250	9,45 9,06	1695 1554	20129 18470	190947 175373	113 113	1685 1554	20129 18470	208357 190699	123 123	2825 2649	20129 18470	208357 190699	74 72
12	300	11,61 11,02	2578 2331	30406 27404	288486 259881	112 112	2578 2331	30406 27404	303706 275455	118 118	4414 3885	30406 27404	303706 275455	69 71
16	400	14,57 13,78	4061 3531	45379 40612	453829 406084	112 115	4061 3531	45379 40612	459091 406119	113 115	4767 4238	45909 40612	459091 406119	96 96
20	500	18,81 18,38 17,94	6851 6533 6215	70877 67663 64449	708943 676665 644564	103 103 103	6851 6533 6215	70877 67663 64449	708943 676665 644564	103 103 103	6851 6533 6215	708943 676665 644564	708943 676665 644564	103 103 103
24	600	22,62 22,06 21,56	9888 9394 8970	100223 95314 91041	1002196 953285 910554	101 101 101	9888 9394 8970	100223 95314 91041	1002196 953285 910554	101 101 101	9888 9394 8970	100223 95314 91041	1002196 953285 910554	101 101 101

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

FLANGE RATING ANSI 150 IMPERIAL

Meter Size [inch]	Meter Size [mm]	Dimensions [inch]				Forged body Material	Weight [lbs]	Length
		A	B	C	L			
3"	DN 80	20.38	16.64	5.79	12.61	LTCS	110	4D
4"	DN 100	21.52	16.99	6.03	15.77	LTCS	143	4D
6"	DN 150	22.47	16.95	7.25	17.74	LTCS	209	3D
8"	DN 200	24.64	17.82	8.08	23.65	LTCS	331	3D
10"	DN 250	26.81	18.80	9.93	29.56	LTCS	485	3D
12"	DN 300	29.45	19.91	11.04	35.48	LTCS	728	3D
14"	DN 350	31.61	21.09	12.22	41.39	LTCS	1036	3D
16"	DN 400	33.86	22.11	13.25	47.30	LTCS	1235	3D
18"	DN 450	35.60	23.10	13.05	53.22	LTCS	1576	3D
20"	DN 500	37.88	24.09	14.03	59.13	LTCS	1995	3D
24"	DN 600	42.14	26.10	16.04	70.96	LTCS	3053	3D

FLANGE RATING ANSI 300 IMPERIAL

Meter Size [inch]	Meter Size [mm]	Dimensions [inch]				Forged body Material	Weight [lbs]	Length
		A	B	C	L			
3"	DN 80	20.38	16.64	5.79	12.61	LTCS	110	4D
4"	DN 100	21.52	16.99	6.03	15.77	LTCS	143	4D
6"	DN 150	22.47	16.95	7.25	17.74	LTCS	209	3D
8"	DN 200	24.64	17.82	8.08	23.65	LTCS	331	3D
10"	DN 250	26.81	18.80	9.93	29.56	LTCS	485	3D
12"	DN 300	29.45	19.91	11.04	35.48	LTCS	728	3D
14"	DN 350	31.61	21.09	12.22	41.39	LTCS	1036	3D
16"	DN 400	33.86	22.11	13.25	47.30	LTCS	1235	3D
18"	DN 450	35.60	23.10	13.05	53.22	LTCS	1576	3D
20"	DN 500	37.88	24.09	14.03	59.13	LTCS	1995	3D
24"	DN 600	42.14	26.10	16.04	70.96	LTCS	3053	3D

FLANGE RATING ANSI 600 IMPERIAL

Meter Size [inch]	Meter Size [mm]	Dimensions [inch]				Forged body Material	Weight [lbs]	Length
		A	B	C	L			
3"	DN 80	20.77	16.64	5.79	12.61	LTCS	132	4D
4"	DN 100	22.39	16.99	6.03	15.77	LTCS	187	4D
6"	DN 150	23.97	16.95	7.29	19.71	LTCS	298	3.33D
8"	DN 200	26.10	17.82	8.28	23.65	LTCS	452	3D
10"	DN 250	28.82	18.80	10.01	29.56	LTCS	705	3D
12"	DN 300	30.91	19.91	11.04	35.48	LTCS	948	3D
14"	DN 350	32.99	21.09	12.22	41.39	LTCS	1268	3D
16"	DN 400	35.60	22.11	13.52	47.30	LTCS	1631	3D
18"	DN 450	37.72	23.10	14.66	53.22	LTCS	2050	3D
20"	DN 500	40.13	24.09	16.04	59.13	LTCS	2646	3D
24"	DN 600	44.62	26.10	18.53	70.96	LTCS	3968	3D

FLANGE RATING ANSI 900 IMPERIAL

Meter Size [inch]	Meter Size [mm]	Dimensions [inch]				Forged body Material	Weight [lbs]	Length
		A	B	C	L			
3"	DN 80	21.37	16.64	5.79	12.61	LTCS	143	4D
4"	DN 100	22.71	16.99	6.03	15.77	LTCS	209	4D
6"	DN 150	24.44	16.95	7.49	23.65	LTCS	375	4D
8"	DN 200	27.08	17.82	9.26	31.54	LTCS	628	4D
10"	DN 250	29.56	18.80	10.76	29.56	LTCS	805	3D
12"	DN 300	31.93	19.91	12.02	35.48	LTCS	1135	3D
14"	DN 350	33.74	21.09	12.65	41.39	LTCS	1455	3D
16"	DN 400	35.99	22.11	12.73	47.30	LTCS	1786	3D
18"	DN 450	38.63	23.10	15.53	53.22	LTCS	2348	3D
20"	DN 500	41.00	24.09	16.91	59.13	LTCS	2987	3D
24"	DN 600	46.63	26.10	20.54	70.96	LTCS	5027	3D

FLANGE RATING ANSI 1500 IMPERIAL

Meter Size [inch]	Meter Size [mm]	Dimensions [inch]				Forged body Material	Weight [lbs]	Length
		A	B	C	L			
3"	DN 80	21.88	16.64	5.79	15.77	LTCS	181	5D
4"	DN 100	23.10	16.99	6.11	19.71	LTCS	269	5D
6"	DN 150	24.76	16.95	7.81	23.65	LTCS	456	4D
8"	DN 200	27.40	17.82	9.58	31.54	LTCS	765	4D
10"	DN 250	30.35	18.80	11.55	39.42	LTCS	1140	4D
12"	DN 300	33.19	20.62	13.32	47.30	LTCS	1726	4D
14"	DN 350	35.40	21.40	14.78	55.19	LTCS	2425	4D
16"	DN 400	37.69	22.11	16.28	63.07	LTCS	3327	4D
18"	DN 450	40.72	22.71	18.05	70.96	LTCS	4301	4D
20"	DN 500	42.97	23.53	19.43	78.84	LTCS	5639	4D
24"	DN 600	49.16	26.10	23.06	94.61	LTCS	9550	4D

FLOW RANGES IMPERIAL - HIGHEST/LOWEST FLOWRANGE PER METER SIZE

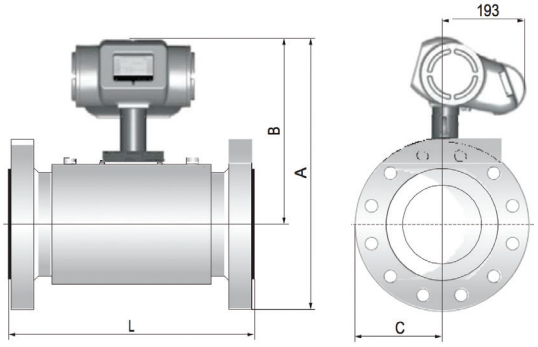
Size		Flange Connection		Spool Diameter					
[Inch]	DN	ANSI Schedule	EN1092-1	ANSI Flange Max ID [inch]	PN Flange Max ID [inch]	Max./Min. Internal Diameter as per type approval** [mm]	Q_{min}	Q_t	Q_{max}
3	80	STD-XS XS-160	PN 10- PN 100	3,07 2,90	3.25	3,15 2,76	459 353	2507 1907	21224 16245
4	100	STD-XS XS-120	PN 10- PN 100	4,03 3,83	4.22	4,13 3,15	565 318	4308 2507	36551 21224
6	150	STD-XS XS-120	PN 10- PN 100	6,07 5,76	6.27	6,10 5,12	706 494	8405 5898	79635 56009
8	200	STD-XS XS-120	PN 10- PN 100	7,98 7,63	8.13	8,27 7,09	1307 953	15397 11336	146203 107392
10	250	STD-80 80-120	PN 10- PN 100	10,02 9,56	10.25	10,24 9,06	2013 1589	2326 18470	224107 175373
12	300	30-60 60-100	PN 10- PN 100	12,09 11,63	12.19	12,60 10,63	3072 2190	35774 25462	339445 241658
14	350	30-60 60-100	PN 10- PN 100	13,25 12,81	13.44	13,58 11,81	3567 2684	38034 28746	394571 298339
16	400	30-60 60-100	PN 10- PN 100	15,25 14,69	15.44	15,55 13,78	4662 3673	49864 39129	517219 406084
18	450	STD 120	PN 10- PN 40		17.43	17,32 14,96	5792 4308	61871 46156	632133 471487
20	500	40 60 80	PN 10- PN 100	19,25 17,00	19.44	19,29 16,93	7204 5544	71936 55373	745599 574182
24	600	40 60 80	PN 10- PN 63	23,26 20,95	23.39	23,43 20,47	10594 8087	106050 81012	1074626 820784
26	650	STD S = 25.4	n/a			25,39 22,44	12466 9747	124626 97327	1254519 979736
30	750	STD S = 31.75	n/a			29,33 25,98	16633 13031	166262 130488	1662581 1304843
36	900	STD S = 31.75	PN 10- PN 63		35	35,24 30,71	23979 18222	239963 182259	2399457 1822450
42	1050	STD S = 31.75	n/a			41,14 37,01	32701 26451	294419 238198	2954958 2390946
48	1200	STD S = 31.75	PN 10- PN 63		47.01	47,05 42,91	42766 35597	385001 320304	3892669 3238641
56	1400	S = 12.7 S = 31.75	PN 10- PN 40		54.87	55,12 53,94	58728 56221	528414 505989	5323197 5097500

***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 (psig)**	These minimum operating pressures are applicable for "standard natural gas", which is defined as follows:			
	3"	58	For other gas-mixtures please reach out to evaluate the application and Pmin accordingly			
	4"	58	**Component**	**Range**	**Component**	**Range**
	6"	58	C1	0-95	He	0-3
	8"	58	N2	0-100	H2	0-10
	10"	73	CO2	0-1.5	CO	0-3
	12"	87	C2	0-100	Ar	0-1
	14"	102	C3	0-12	O2	0-21
	16"	116	C4	0-6	H2O	0-DewPoint
	20"	145	C5	0-4	H2S	0-100
	24"	174	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: Ⓔx 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

Honeywell