Q.SONIC®MAX

Multi-Path Ultrasonic Gas Meter with highest industry standard for Custody Transfer Measurement

BRIEF INFORMATION

The ultrasonic gas flow meter Q.Sonic-max is a multipath ultrasonic gas flow meter utilizing the most accurate acoustic path configuration available to the market.

Combining the best out of two worlds to maintain the lowest uncertainty with high robustness to meet the individual operational demands.

It is the first 8 path meter combining reflection technology with direct technology. Due to this unique patented path configuration it maintains the lowest uncertainty with the most extended diagnostics possibilities. With two swirls paths, double reflection, for linearity and stability and six direct paths for enhanced robustness it offers unequalled flow profile recognition and maintains the lowest uncertainty in all situations. No exclusions from the standard or restricted flow rate to meet OIML accuracy class 0.5.

Q.Sonic-max 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 cell. 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-max 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-max flow meter either local or remote.

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

MAIN FEATURES

- 8-path reflective and direct technology
- Sizes 4" to 24" (DN 100 to DN 600)—larger sizes available upon request till 36"
- 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) class 0.5 approved
- ISO 17089-1 (2019) class 0.5 approved
- AGA 9 (2022) compliant
- MID approved

Options

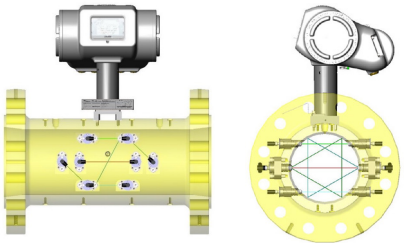
- SHDSL high-speed communication via Ethernet Range Extender (ERE)
- Pressure sensor for reynolds and geometrical correction
- Retraction tool for transducer exchange 'under pressure'
- Stainless Steel SPU enclosure

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

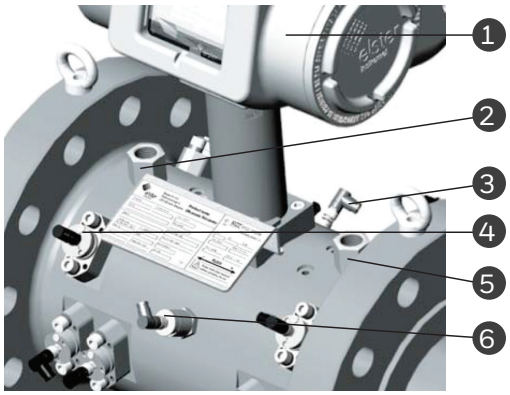


The Q.Sonic-max uses three pairs of direct cross X paths in the same plane, and two swirl double reflection paths, culminating in a sophisticated acoustic imagining and interrogation of the gas stream.

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.

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)

TRANSDUCER PATH	
Path No.	**Path Type**
1	Swirl path (B1-CW*)
2	direct path (D-RT)
3	direct path (D-LT)
4	direct path (A1)
5	direct path (A2)
6	direct path (D-RB)
7	direct path (D-LB)
8	Swirl path (B1-CCW**)

A: axial path; B : swirl path; D : direct path;
CW : clockwise; CCW : counterclockwise;
RT : RT: right top; LT : left top;
RB : right bottom; LB : left bottom

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 METRIC - STANDARD METERS (FIXED DIAMETER TAPERED TO ANSI SCH 40/60/80)

Size		Internal Standard Diameter [mm]	Flow range according to MID:2014 [m^3/h]				Flow range according to ISO 17089:2019 & OIML R137:2012 class 1 [m^3/h]				Flow range according to AGA9:2022 & ISO 17089:2019 & OIML R137:2012 class 0.5 [m^3/h]			
[Inch]	DN		Q_{min}	Q_t	Q_{max}	Turndown	Q_{min}	Q_t	Q_{max}	Turndown	Q_{min}	Q_t	Q_{max}	Turndown
4	100	97	13	100	1000	77	13	100	1000	77	24	100	1000	42
6	150	146 139	17 16	221 200	2206 1999	118 118	17 16	221 200	2206 1999	118 118	36 33	221 200	2206 1999	61 61
8	200	190 180	30 27	400 359	4001 3591	133 133	30 27	400 359	4001 3591	133 133	61 55	400 359	4001 3591	66 65
10	250	240 230	47 43	590 541	5896 5414	125 126	47 43	590 541	5896 5414	125 126	65 60	590 541	5896 5414	91 90
12	300	295 280	74 67	832 749	8317 7492	112 112	74 67	832 749	8317 7492	112 112	100 90	832 749	8317 7492	83 83
16	400	370 350	116 104	1301 1164	13006 11638	112 112	116 104	1301 1164	13006 11638	112 112	116 104	1301 1164	13006 11638	113 116
20	500	477,8 466,8 455,6	194 185 176	2007 1916 1825	20075 19161 18252	103 103 103	194 185 176	2007 1916 1825	20075 19161 18252	103 104	194 185 176	2007 1916 1825	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	2838 2699 2578	28379 26994 25784	101 101	280 266 254	2838 2699 2578	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			
4"	DN 100	546	431	153	400	LTCS	70	4D
6"	DN 150	570	430	184	450	LTCS	110	3D
8"	DN 200	625	452	205	600	LTCS	175	3D
10"	DN 250	680	477	252	750	LTCS	250	3D
12"	DN 300	747	505	280	900	LTCS	375	3D
14"	DN 350	802	535	310	1050	LTCS	520	3D
16"	DN 400	859	561	336	1200	LTCS	630	3D
18"	DN 450	903	586	331	1350	LTCS	765	3D
20"	DN 500	961	611	356	1500	LTCS	956	3D
22"	DN 600	1015	637	382	1650	LTCS	1233	3D
24"	DN 600	1069	662	457	1800	LTCS	1449	3D

FLANGE RATING ANSI 300 METRIC

Meter Size [inch]	Meter Size [mm]	Dimensions [mm]				Forged body Material	Weight [kg]	Length
		A	B	C	L			
4"	DN 100	558	431	153	400	LTCS	80	4D
6"	DN 150	589	430	184	450	LTCS	125	3D
8"	DN 200	643	452	205	600	LTCS	195	3D
10"	DN 250	700	477	252	750	LTCS	280	3D
12"	DN 300	765	505	280	900	LTCS	420	3D
14"	DN 350	827	535	310	1050	LTCS	580	3D
16"	DN 400	884	561	336	1200	LTCS	720	3D
18"	DN 450	941	586	356	1350	LTCS	870	3D
20"	DN 500	999	611	388	1500	LTCS	1100	3D
22"	DN 550	1060	637	423	1650	LTCS	1345	3D
24"	DN 600	1120	662	457	1800	LTCS	1530	3D

FLANGE RATING ANSI 600 METRIC

Meter Size [inch]	Meter Size [mm]	Dimensions [mm]				Forged body Material	Weight [kg]	Length
		A	B	C	L			
4"	DN 100	568	431	153	400	LTCS	85	4D
6"	DN 150	608	430	185	500	LTCS	150	3.33D
8"	DN 200	662	452	210	600	LTCS	225	3D
10"	DN 250	731	477	254	750	LTCS	350	3D
12"	DN 300	784	505	280	900	LTCS	480	3D
14"	DN 350	837	535	310	1050	LTCS	630	3D
16"	DN 400	903	561	343	1200	LTCS	810	3D
18"	DN 450	957	586	372	1350	LTCS	980	3D
20"	DN 500	1018	611	407	1500	LTCS	1250	3D
22"	DN 550	1075	637	439	1650	LTCS	1585	3D
24"	DN 600	1132	662	470	1800	LTCS	1860	3D

FLANGE RATING ANSI 900 METRIC

Meter Size [inch]	Meter Size [mm]	Dimensions [mm]				Forged body Material	Weight [kg]	Length
		A	B	C	L			
4"	DN 100	576	431	153	400	LTCS	95	4D
6"	DN 150	620	430	190	600	LTCS	185	4D
8"	DN 200	687	452	235	800	LTCS	310	4D
10"	DN 250	750	477	273	750	LTCS	400	3D
12"	DN 300	810	505	305	900	LTCS	560	3D
14"	DN 350	856	535	321	1050	LTCS	720	3D
16"	DN 400	913	561	323	1200	LTCS	880	3D
18"	DN 450	980	586	394	1350	LTCS	1120	3D
20"	DN 500	1040	611	429	1500	LTCS	1400	3D
22"	DN 550	1112	637	475	1650	LTCS	1915	3D
24"	DN 600	1183	662	521	1800	LTCS	2370	3D

FLANGE RATING ANSI 1500 METRIC

Meter Size [inch]	Meter Size [mm]	Dimensions [mm]				Forged body Material	Weight [kg]	Length
		A	B	C	L			
4"	DN 100	586	431	155	500	LTCS	110	5D
6"	DN 150	628	430	198	600	LTCS	235	4D
8"	DN 200	695	452	243	800	LTCS	395	4D
10"	DN 250	770	477	293	1000	LTCS	510	4D
12"	DN 300	842	523	338	1200	LTCS	710	4D
14"	DN 350	898	543	375	1400	LTCS	910	4D
16"	DN 400	956	561	413	1600	LTCS	1110	4D
18"	DN 450	1033	576	458	1800	LTCS	1365	4D
20"	DN 500	1090	597	493	1500	LTCS	1675	3D
22"	DN 550	1169	630	539	1650	LTCS	2290	3D
24"	DN 600	1247	662	585	1800	LTCS	2845	3D

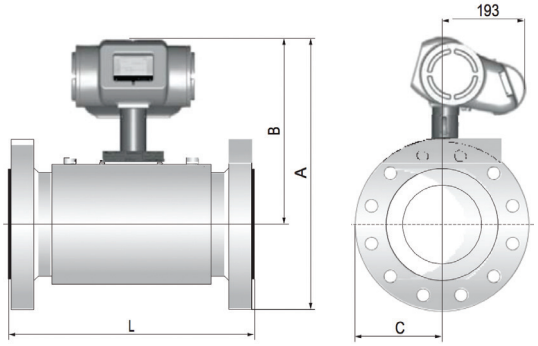
FLOW RANGES METRIC - HIGHEST/LOWEST FLOWRANGE PER METER SIZE

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}
4	100	STD-XS XS-120	PN 10- PN 100	102.30 97.20	107.10	102,3 90	14 11	134 53	1113 861
6	150	STD-XS XS-120	PN 10- PN 100	154.10 146.30	159.3	154,1 139	19 16	134 109	2457 1999
8	200	STD-XS XS-120	PN 10- PN 100	202.70 193.70	206.50	206,4 180	35 27	472 359	4722 3591
10	250	STD-80 80-120	PN 10- PN 100	254.50 242.80	260.40	254,4 230	53 43	366 299	6624 5414
12	300	30-60 60-100	PN 10- PN 100	307.00 295.30	309.70	311,2 280	82 67	411 333	9255 7492
14	350	30-60 60-100	PN 10- PN 100	336.50 325.40	341.40	325 305	84 74	448 395	10005 8811
16	400	30-60 60-100	PN 10- PN 100	387.30 373.00	392.20	393,7 350	131 104	657 520	14725 11638
18	450	STD 120	PN 10- PN 40		442.80	437,9 387,1	130 102	1464 1144	14693 11482
20	500	40 60 80	PN 10- PN 100	488.90* 431.80*	493.80	488,9 431,8	203 158	1081 843	21018 16396
22	550	40 60 80	PN 10- PN 100	539.74* 450,84*	539.74	530 489	222 189	1112 947	22794 19404
24	600	40 60 80	PN 10- PN 63	590.90* 532.22*	594.00	590,9 532	296 240	1481 1201	30012 24345
26	650	STD S = 25.4	n/a			640,9 609	302 273	3252 2938	32983 29801
30	750	STD S = 31.75	n/a			742,9 730,3	390 377	4525 4373	46034 44485
36	900	STD S = 31.75	PN 10- PN 63		889.00	894,9 850,5	679 614	3397 3068	67477 60948

***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 ASTM A694 up till grade F70
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^{Max} Technical Specifications

TECHNICAL DATA

Measurement Principle	Ultrasonic transit time measurement
Sizes	4" to 24"— larger sizes available upon request (DN 100 to DN 600) till 36"

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 (technical limitation of Pmin is 2barg)			
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, ASTM A694 up till Grade F70	
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	• MMS (Manufacturing Message Specification) • Built-in web server • Transport Layer Security (TLS) encryption (with FW3.40A)
Metrological Approval	MID T10586 (optional)[2]	
MID Accuracy	Class 1.0	
Metrological Approval	OIML R137/2012- A-NL1-20.076 (6 optional)	
OIML Accuracy	Class 0.5	
Metrological Approval	ISO CoC-3572038-0176 (6 optional)	
ISO Accuracy	Class 0.5	
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
- Mild 5D/USM/3D
- Severe 10D/USM/3D or 5D/CPA50 or NOVA50E/5D/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

[6] Q_t to Q_{max} Q_t to Q_{max} with straight inlet/outlet spool of
- Mild 5D/USM/3D
- Severe 5D/CPA50 or NOVA50E/5D/USM/3D

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THE FUTURE IS WHAT WE MAKE IT

Honeywell