

# Q.SONIC<sup>®</sup> PLUS

## Multi-Path Ultrasonic Gas Meter for Custody Transfer Measurement

### BRIEF INFORMATION

The ultrasonic gas flow meter Q.Sonic<sup>plus</sup> 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 unequalled profile recognition and diagnostic possibilities.

Another innovation of the Q.Sonic<sup>plus</sup> 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 differ massively from the conditions during the calibration process since both high pressure and high temperatures result in an increase in the tube cross-section and a change in path lengths and angles.

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.

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.

SonicExplorer, a PC based software package, for the operator, service, technician and engineering world is used to configure, diagnose, and monitor the Q.Sonic<sup>plus</sup> flow meter either local or remote.



### MAIN FEATURES

- 6-path reflective technology
- Sizes 3" to 36"—larger sizes available upon request (DN 80 to DN 900)
- Pressure ratings ANSI class 150 to 1500 PN on request
- All-metal-encapsulated intrinsically safe transducers
- Internal temperature sensor
- Flow profile detection with swirl and asymmetry measurement
- No moving parts
- No pressure drop
- Bi-directional measurement
- SonicExplorer PC software for configuration, diagnostics and health care
- OIML R137-1 compliant
- AGA 9 compliant
- MID approved.

#### Options

- VDSL range extender for high-speed communication (TCP/IP)
- Pressure sensor for Reynolds corrections
- Retraction tool for transducer exchange 'under pressure.'

#### Applications

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

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 from Honeywell Elster or Engineer/Technician of your choice..

## Path Configuration



The Q.Sonic<sup>plus</sup> 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

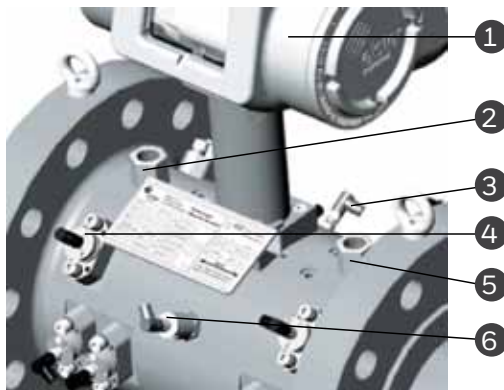
The transducers are all-metal encapsulated with titanium, which offers a smooth surface to minimize contamination. The ultrasonic frequency of 200 kHz ensures a good balance between resolution and attenuation/propagation of the signal.

| 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 plate, prepared for retraction under pressure
- 5 Second pressure connection point
- 6 Optional pressure sensor for geometry correction and line density estimation (profile correction)

Diagnostic and selfchecking 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.

## 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 colour 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.

## SonicExplorer®

Windows®-based software package for the Q.Sonicplus for on-site and remote use. SonicExplorer is a tool that allows the health and performance of the device to be determined in situ so that informed decisions can be made in respect of maintenance or other tasks related to the ultrasonic flow meter.



### Function overview:

- Meter data base
- Configuration, setting and documentation
- Diagnostics
- Health reporting
- Customer service pack (automated collection of relevant data for off-site analysis)

| FLOW RANGES METRIC                   |        |                       |                   |                  |                         |                                 |                                 |  |                                   |                  |                  |               |
|--------------------------------------|--------|-----------------------|-------------------|------------------|-------------------------|---------------------------------|---------------------------------|--|-----------------------------------|------------------|------------------|---------------|
| Type                                 | Size   |                       | Flange Connection |                  | Spool Diameter          |                                 | Internal                        | Extended Flow range acc. to MID [m³/h] |                                   |                  |                  |               |
|                                      | [Inch] | DN                    | ANSI Schedule     | EN 1092-1        | ANSI Flange Max ID [mm] | PN Flange Max ID [mm]           | Diameter [mm]                   | Ex-<br>tended<br>Q <sub>min</sub>      | Standard Flow range [m³/h]        |                  |                  | Turn-<br>down |
|                                      |        |                       |                   |                  |                         |                                 |                                 |  | Stand-<br>ard<br>Q <sub>min</sub> | Q <sub>t</sub>   | Q <sub>max</sub> |               |
| Reduced bore<br>fixed inner diameter | 3      | 80                    | STD-XS<br>XS-160  | PN 10-<br>PN 100 | 77.90<br>73.70          | 82.50                           | 73<br>70                        | 11<br>10                               | 15<br>14                          | 60<br>55         | 600<br>550       | 56<br>56      |
|                                      | 4      | 100                   | STD-XS<br>XS-120  | PN 10-<br>PN 100 | 102.30<br>97.20         | 107.10                          | 97<br>90                        | 13<br>11                               | 24<br>21                          | 100<br>90        | 1000<br>900      | 79<br>80      |
|                                      | 6      | 150                   | STD-XS<br>XS-120  | PN 10-<br>PN 100 | 154.10<br>146.30        | 159.30                          | 146<br>139                      | 18<br>16                               | 45<br>41                          | 220<br>200       | 2200<br>2000     | 124<br>125    |
|                                      | 8      | 200                   | STD-XS<br>XS-120  | PN 10-<br>PN 100 | 202.70<br>193.70        | 206.50                          | 190<br>180                      | 30<br>27                               | 61<br>55                          | 400<br>350       | 3900<br>3500     | 130<br>130    |
|                                      | 10     | 250                   | STD-80<br>80-120  | PN 10-<br>PN 100 | 254.50<br>242.80        | 260.40                          | 240<br>230                      | 48<br>44                               | 80<br>75                          | 590<br>540       | 5900<br>5400     | 123<br>123    |
|                                      | 12     | 300                   | 30-60<br>60-100   | PN 10-<br>PN 100 | 307.00<br>295.30        | 309.70                          | 295<br>280                      | 73<br>66                               | 125<br>110                        | 860<br>780       | 8600<br>7800     | 118<br>118    |
|                                      | 14     | 350                   | 30-60<br>60-100   | PN 10-<br>PN 100 | 336.50<br>325.40        | 341.40                          | 325<br>305                      | 85<br>75                               | 150<br>130                        | 1000<br>900      | 10000<br>9000    | 118<br>120    |
|                                      | 16     | 400                   | 30-60<br>60-100   | PN 10-<br>PN 100 | 387.30<br>373.00        | 392.20                          | 370<br>350                      | 115<br>100                             | 135<br>120                        | 1300<br>1150     | 13000<br>11500   | 113<br>115    |
| Full bore<br>customized              | 18     | 450                   | STD 120           | PN 10-<br>PN 40  |                         | 442.80                          | Max. 437.90<br>Min. 387.10      | 165<br>120                             | 165<br>120                        | 1800<br>1350     | 18000<br>13500   | 109<br>113    |
|                                      | 20     | 500                   | STD 120           | PN 10-<br>PN 100 |                         | 493.80                          | Max. 488.90<br>Min. 431.80      | 200<br>160                             | 200<br>160                        | 2100<br>1600     | 21000<br>16000   | 105<br>100    |
|                                      | 24     | 600                   | STD 100           | PN 10-<br>PN 63  |                         | 594.00                          | Max. 590.90<br>Min. 532.22      | 295<br>240                             | 295<br>240                        | 3000<br>2400     | 30000<br>24000   | 102<br>100    |
|                                      | 26     | 650                   | STD<br>S = 25.4   | n/a              |                         |                                 | Max. 640.90<br>Min. 609.20      | 330<br>275                             | 330<br>275                        | 3300<br>2750     | 33000<br>27500   | 100<br>100    |
|                                      | 30     | 750                   | STD<br>S = 31.75  | n/a              |                         |                                 | Max. 742.90<br>Min. 730.30      | 460<br>370                             | 460<br>370                        | 4600<br>3700     | 46000<br>37000   | 100<br>100    |
|                                      | 36     | 900                   | STD<br>S = 31.75  | PN 10-<br>PN 63  |                         | 889.00                          | Max. 894.90<br>Min. 850.50      | 670<br>525                             | 670<br>525                        | 6700<br>5250     | 67000<br>52500   | 100<br>100    |
|                                      | 42     | 1050                  | STD<br>S = 31.75  | n/a              |                         |                                 | Max.<br>1047.90<br>Min. 1003.50 | 920<br>750                             | 920<br>750                        | 8300<br>6750     | 83000<br>67500   | 90<br>90      |
|                                      | 48     | 1200                  | STD<br>S = 31.75  | PN 10-<br>PN 63  |                         | 1194.00                         | Max.<br>1199.90<br>Min. 1155.50 | 1200<br>1000                           | 1200<br>1000                      | 11000<br>9100    | 110000<br>91000  | 92<br>91      |
| 56                                   | 1400   | S = 12.7<br>S = 31.75 | PN 10-<br>PN 40   |                  | 1393.60                 | Max.<br>1396.60<br>Min. 1358.50 | 1650<br>1600                    | 1650<br>1600                           | 15000<br>14300                    | 150000<br>143000 | 91<br>89         |               |

## FLOW RANGES IMPERIAL

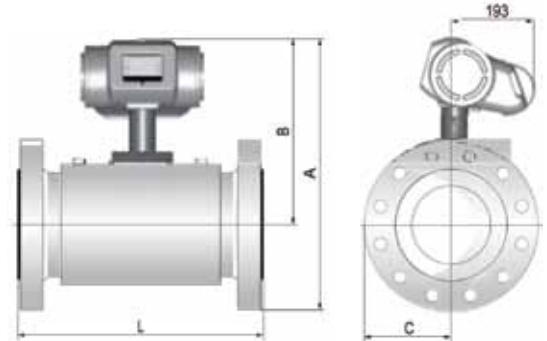
| Type                              | Size   |      | Flange Connection  |              | Spool Diameter            |                         | Internal                 | Extended Flow range acc. to MID [MC FD] |                            |                |                  | Turn-down  |
|-----------------------------------|--------|------|--------------------|--------------|---------------------------|-------------------------|--------------------------|---|----------------------------|----------------|------------------|------------|
|                                   | [Inch] | DN   | ANSI Schedule      | EN1092-1     | ANSI Flange Max ID [inch] | PN Flange Max ID [inch] | Diameter [inch]          | Flow [MC FD]                            |                            |                |                  |            |
|                                   |        |      |                    |              |                           |                         |                          | Ex-tended Q <sub>min</sub>              | Stan-dard Q <sub>min</sub> | Q <sub>t</sub> | Q <sub>max</sub> |            |
| Reduced bore fixed inner diameter | 3      | 80   | STD-XS XS-160      | PN 10-PN 100 | 3.07<br>2.90              | 3.25                    | 2.87<br>2.76             | 9<br>8                                  | 13<br>12                   | 51<br>47       | 509<br>466       | 56<br>56   |
|                                   | 4      | 100  | STD-XS XS-120      | PN 10-PN 100 | 4.03<br>3.83              | 4.22                    | 3.82<br>3.54             | 11<br>9                                 | 20<br>18                   | 85<br>76       | 848<br>763       | 79<br>80   |
|                                   | 6      | 150  | STD-XS XS-120      | PN 10-PN 100 | 6.07<br>5.76              | 6.27                    | 5.75<br>5.47             | 15<br>14                                | 38<br>35                   | 186<br>170     | 1865<br>1695     | 124<br>125 |
|                                   | 8      | 200  | STD-XS XS-120      | PN 10-PN 100 | 7.98<br>7.63              | 8.13                    | 7.48<br>7.09             | 25<br>23                                | 52<br>47                   | 339<br>297     | 3250<br>2966     | 130<br>130 |
|                                   | 10     | 250  | STD-80 80-120      | PN 10-PN 100 | 10.02<br>9.56             | 10.25                   | 9.45<br>9.06             | 41<br>37                                | 68<br>64                   | 500<br>458     | 5001<br>4577     | 123<br>123 |
|                                   | 12     | 300  | 30-60 60-100       | PN 10-PN 100 | 12.09<br>11.63            | 12.19                   | 11.61<br>11.02           | 62<br>56                                | 106<br>93                  | 729<br>661     | 7289<br>6611     | 118<br>118 |
|                                   | 14     | 350  | 30-60 60-100       | PN 10-PN 100 | 13.25<br>12.81            | 13.44                   | 12.80<br>12.01           | 72<br>74                                | 127<br>110                 | 848<br>763     | 8476<br>7628     | 118<br>120 |
|                                   | 16     | 400  | 30-60 60-100       | PN 10-PN 100 | 15.25<br>14.69            | 15.44                   | 14.57<br>13.78           | 97<br>85                                | 114<br>102                 | 1102<br>975    | 11018<br>9747    | 113<br>115 |
| Full bore customized              | 18     | 450  | STD 120            | PN 10-PN 40  |                           | 17.43                   | Max. 17.24<br>Min. 15.24 | 140<br>102                              | 140<br>102                 | 1526<br>1144   | 15256<br>11442   | 109<br>113 |
|                                   | 20     | 500  | STD 120            | PN 10-PN 100 |                           | 19.44                   | Max. 19.25<br>Min. 17    | 170<br>136                              | 170<br>136                 | 1780<br>1356   | 17799<br>13561   | 105<br>100 |
|                                   | 24     | 600  | STD 100            | PN 10-PN 63  |                           | 23.39                   | Max. 23.26<br>Min. 20.95 | 250<br>203                              | 250<br>203                 | 2543<br>2034   | 25427<br>20341   | 102<br>100 |
|                                   | 26     | 650  | STD S = 25.4       | n/a          |                           |                         | Max. 25.23<br>Min. 23.98 | 280<br>233                              | 280<br>233                 | 2797<br>2331   | 27969<br>23308   | 100<br>100 |
|                                   | 30     | 750  | STD S = 31.75      | n/a          |                           |                         | Max. 29.25<br>Min. 28.75 | 390<br>314                              | 390<br>314                 | 3899<br>3136   | 38987<br>31359   | 100<br>100 |
|                                   | 36     | 900  | STD S = 31.75      | PN 10-PN 63  |                           | 35.00                   | Max. 35.23<br>Min. 33.48 | 568<br>445                              | 568<br>445                 | 5679<br>4450   | 56786<br>44496   | 100<br>100 |
|                                   | 42     | 1050 | STD S = 31.75      | n/a          |                           |                         | Max. 41.26<br>Min. 39.51 | 780<br>636                              | 780<br>636                 | 7035<br>5721   | 70347<br>57210   | 90<br>90   |
|                                   | 48     | 1200 | STD S = 31.75      | PN 10-PN 63  |                           | 47.01                   | Max. 47.24<br>Min. 45.49 | 1017<br>848                             | 1017<br>848                | 9323<br>7713   | 93231<br>77127   | 92<br>91   |
|                                   | 56     | 1400 | S = 12.7 S = 31.75 | PN 10-PN 40  |                           | 54.87                   | Max. 54.98<br>Min. 53.48 | 1398<br>1356                            | 1398<br>1356               | 12713<br>12120 | 127133<br>121200 | 91<br>89   |

For MID approved sizes and flow ranges, please also refer to the latest EC Type-examination Certificate T10335

### Material Specifications ANSI 150-900 (flow cell)

|                          |  |
|--------------------------|--|
| LTCS Forging             | ASTM A350-LF2 Cl.1                       |
| LTCS Welding             | ASTM A333 Grade 6/ASTM A350-LF2 Cl.1     |
| SS Forging               | ASTM A182-F316                           |
| SS Welding               | ASTM A312-TP316L/ASTM A182-F316L         |
| LTCS/SS                  | Size > 24" as per Customer Specification |
| Material Certificate 3.1 |  |

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



### FLANGE RATING ANSI 150 METRIC

| Meter Size [inch] | Meter Size [mm] | Dimensions [mm] |     |     |      | Flow Cell Material | Weight Forged [kg] | Weight Welded [kg] | Length |
|-------------------|-----------------|-----------------|-----|-----|------|--------------------|--------------------|--------------------|--------|
|                   |                 | A               | B   | C   | L    |                    |                    |                    |        |
| 3"                | DN 80           | 517             | 422 | 147 | 320  | LTCS/SS            | 47                 | -                  | 4D     |
| 4"                | DN 100          | 546             | 431 | 153 | 400  | LTCS/SS            | 61                 | -                  | 4D     |
| 6"                | DN 150          | 570             | 430 | 184 | 450  | LTCS/SS            | 84                 | -                  | 3D     |
| 8"                | DN 200          | 625             | 452 | 205 | 600  | LTCS/SS            | 134                | -                  | 3D     |
| 10"               | DN 250          | 680             | 477 | 252 | 750  | LTCS/SS            | 195                | -                  | 3D     |
| 12"               | DN 300          | 747             | 505 | 280 | 900  | LTCS/SS            | 280                | -                  | 3D     |
| 14"               | DN 350          | 802             | 535 | 310 | 1050 | LTCS/SS            | 369                | -                  | 3D     |
| 16"               | DN 400          | 859             | 561 | 336 | 1200 | LTCS/SS            | 456                | -                  | 3D     |
| 18"               | DN 450          | 903             | 586 | 331 | 1350 | LTCS/SS            | 689                | -                  | 3D     |
| 20"               | DN 500          | 961             | 611 | 356 | 1500 | LTCS/SS            | 780                | -                  | 3D     |
| 24"               | DN 600          | 1069            | 662 | 407 | 1800 | LTCS/SS            | -                  | 687                | 3D     |
| 30"               | DN 750          | 1230            | 738 | 492 | 2250 | LTCS/SS            | -                  | 781                | 3D     |
| 32"               | DN 800          | 1294            | 764 | 530 | 2400 | LTCS/SS            | -                  | 929                | 3D     |
| 40"               | DN 1000         | 1510            | 865 | 645 | 3000 | LTCS/SS            | -                  | 1650               | 3D     |

### FLANGE RATING ANSI 150 IMPERIAL

| Meter Size [inch] | Meter Size [mm] | Dimensions [inch] |         |         |          | Flow Cell Material | Weight Forged [lb] | Weight Welded [lb] | Length |
|-------------------|-----------------|-------------------|---------|---------|----------|--------------------|--------------------|--------------------|--------|
|                   |                 | A                 | B       | C       | L        |                    |                    |                    |        |
| 3"                | DN 80           | 20.3543           | 16.6142 | 5.7874  | 12.5984  | LTCS/SS            | 102.63             | -                  | 4D     |
| 4"                | DN 100          | 21.4961           | 16.9685 | 6.0236  | 15.7480  | LTCS/SS            | 133.42             | -                  | 4D     |
| 6"                | DN 150          | 22.4409           | 16.9291 | 7.2441  | 17.7165  | LTCS/SS            | 184.55             | -                  | 3D     |
| 8"                | DN 200          | 24.6063           | 17.7953 | 8.0709  | 23.6220  | LTCS/SS            | 295.20             | -                  | 3D     |
| 10"               | DN 250          | 26.7717           | 18.7795 | 9.9213  | 29.5276  | LTCS/SS            | 430.12             | -                  | 3D     |
| 12"               | DN 300          | 29.4094           | 19.8819 | 11.0236 | 35.4331  | LTCS/SS            | 616.85             | -                  | 3D     |
| 14"               | DN 350          | 31.5748           | 21.0630 | 12.2047 | 41.3386  | LTCS/SS            | 813.5              | -                  | 3D     |
| 16"               | DN 400          | 33.8189           | 22.0866 | 13.2283 | 47.2441  | LTCS/SS            | 1005.3             | -                  | 3D     |
| 18"               | DN 450          | 35.5512           | 23.0709 | 13.0315 | 53.1496  | LTCS/SS            | 1519.0             | -                  | 3D     |
| 20"               | DN 500          | 37.8346           | 24.0551 | 14.0157 | 59.0551  | LTCS/SS            | 1719.6             | -                  | 3D     |
| 24"               | DN 600          | 42.0866           | 26.0630 | 16.0236 | 70.8661  | LTCS/SS            | -                  | 1513.69            | 3D     |
| 30"               | DN 750          | 48.4252           | 29.0551 | 19.3701 | 88.5827  | LTCS/SS            | -                  | 1722.58            | 3D     |
| 32"               | DN 800          | 50.9449           | 30.0787 | 20.8661 | 94.4882  | LTCS/SS            | -                  | 2048.14            | 3D     |
| 36"               | DN 900          | 55.0787           | 32.0472 | 22.9921 | 106.2992 | LTCS/SS            | -                  | 2985.76            | 3D     |
| 40"               | DN 1000         | 59.4488           | 34.0551 | 25.3937 | 118.1102 | LTCS/SS            | -                  | 3638.29            | 3D     |

### FLANGE RATING ANSI 300 METRIC

| Meter Size [inch] | Meter Size [mm] | Dimensions [mm] |     |     |      | Flow Cell Material | Weight Forged [kg] | Weight Welded [kg] | Length |
|-------------------|-----------------|-----------------|-----|-----|------|--------------------|--------------------|--------------------|--------|
|                   |                 | A               | B   | C   | L    |                    |                    |                    |        |
| 3"                | DN 80           | 527             | 422 | 147 | 320  | LTCS/SS            | 51                 | -                  | 4D     |
| 4"                | DN 100          | 558             | 431 | 153 | 400  | LTCS/SS            | 70                 | -                  | 4D     |
| 6"                | DN 150          | 589             | 430 | 184 | 450  | LTCS/SS            | 101                | -                  | 3D     |
| 8"                | DN 200          | 643             | 452 | 205 | 600  | LTCS/SS            | 155                | -                  | 3D     |
| 10"               | DN 250          | 700             | 477 | 252 | 750  | LTCS/SS            | 226                | -                  | 3D     |
| 12"               | DN 300          | 765             | 505 | 280 | 900  | LTCS/SS            | 320                | -                  | 3D     |
| 14"               | DN 350          | 827             | 535 | 310 | 1050 | LTCS/SS            | 439                | -                  | 3D     |
| 16"               | DN 400          | 884             | 561 | 336 | 1200 | LTCS/SS            | 539                | -                  | 3D     |
| 18"               | DN 450          | 941             | 586 | 356 | 1350 | LTCS/SS            | 806                | -                  | 3D     |
| 20"               | DN 500          | 999             | 611 | 388 | 1500 | LTCS/SS            | 839                | -                  | 3D     |
| 24"               | DN 600          | 1120            | 662 | 457 | 1800 | LTCS/SS            | -                  | 911                | 3D     |
| 30"               | DN 750          | 1284            | 738 | 546 | 2250 | LTCS/SS            | -                  | 1252               | 3D     |
| 32"               | DN 800          | 1339            | 764 | 575 | 2400 | LTCS/SS            | -                  | 1575               | 3D     |
| 36"               | DN 900          | 1449            | 814 | 635 | 2700 | LTCS/SS            | -                  | 2159               | 3D     |
| 40"               | DN 1000         | 1485            | 865 | 619 | 3000 | LTCS/SS            | -                  | 2096               | 3D     |

### FLANGE RATING ANSI 300 IMPERIAL

| Meter Size [inch] | Meter Size [mm] | Dimensions [inch] |         |         |          | Flow Cell Material | Weight Forged [lb] | Weight Welded [lb] | Length |
|-------------------|-----------------|-------------------|---------|---------|----------|--------------------|--------------------|--------------------|--------|
|                   |                 | A                 | B       | C       | L        |                    |                    |                    |        |
| 3"                | DN 80           | 20.7480           | 16.6142 | 5.7874  | 12.5984  | LTCS/SS            | 112.06             | -                  | 4D     |
| 4"                | DN 100          | 21.9685           | 16.9685 | 6.0236  | 15.7480  | LTCS/SS            | 154.06             | -                  | 4D     |
| 6"                | DN 150          | 23.1890           | 16.9291 | 7.2441  | 17.7165  | LTCS/SS            | 221.76             | -                  | 3D     |
| 8"                | DN 200          | 25.3150           | 17.7953 | 8.0709  | 23.6220  | LTCS/SS            | 341.47             | -                  | 3D     |
| 10"               | DN 250          | 27.5591           | 18.7795 | 9.9213  | 29.5276  | LTCS/SS            | 499.02             | -                  | 3D     |
| 12"               | DN 300          | 30.1181           | 19.8819 | 11.0236 | 35.4331  | LTCS/SS            | 706.47             | -                  | 3D     |
| 14"               | DN 350          | 32.5591           | 21.0630 | 12.2047 | 41.3386  | LTCS/SS            | 967.8              | -                  | 3D     |
| 16"               | DN 400          | 34.8031           | 22.0866 | 13.2283 | 47.2441  | LTCS/SS            | 1188.3             | -                  | 3D     |
| 18"               | DN 450          | 37.0472           | 23.0709 | 14.0157 | 53.1496  | LTCS/SS            | 1776.9             | -                  | 3D     |
| 20"               | DN 500          | 39.3307           | 24.0551 | 15.2756 | 59.0551  | LTCS/SS            | 1849.7             | -                  | 3D     |
| 24"               | DN 600          | 44.0945           | 26.0630 | 17.9921 | 70.8661  | LTCS/SS            | -                  | 2008.74            | 3D     |
| 30"               | DN 750          | 50.5512           | 29.0551 | 21.4961 | 88.5827  | LTCS/SS            | -                  | 2761.20            | 3D     |
| 32"               | DN 800          | 52.7165           | 30.0787 | 22.6378 | 94.4882  | LTCS/SS            | -                  | 3472.04            | 3D     |
| 36"               | DN 900          | 57.0472           | 32.0472 | 25.0000 | 106.2992 | LTCS/SS            | -                  | 4760.79            | 3D     |
| 40"               | DN 1000         | 58.4646           | 34.0551 | 24.3701 | 118.1102 | LTCS/SS            | -                  | 4621.40            | 3D     |

**FLANGE RATING ANSI 600 METRIC**

| Meter Size [inch] | Meter Size [mm] | Dimensions [mm] |     |     |      | Flow Cell Material | Weight Forged [kg] | Weight Welded [kg] | Length |
|-------------------|-----------------|-----------------|-----|-----|------|--------------------|--------------------|--------------------|--------|
|                   |                 | A               | B   | C   | L    |                    |                    |                    |        |
| 3"                | DN 80           | 527             | 422 | 147 | 320  | LTCS/SS            | 53                 | -                  | 4D     |
| 4"                | DN 100          | 568             | 431 | 153 | 400  | LTCS/SS            | 82                 | -                  | 4D     |
| 6"                | DN 150          | 608             | 430 | 185 | 500  | LTCS/SS            | 134                | -                  | 3.33D  |
| 8"                | DN 200          | 662             | 452 | 210 | 600  | LTCS/SS            | 200                | -                  | 3D     |
| 10"               | DN 250          | 731             | 477 | 254 | 750  | LTCS/SS            | 312                | -                  | 3D     |
| 12"               | DN 300          | 784             | 505 | 280 | 900  | LTCS/SS            | 424                | -                  | 3D     |
| 14"               | DN 350          | 837             | 535 | 310 | 1050 | LTCS/SS            | 492                | -                  | 3D     |
| 16"               | DN 400          | 903             | 561 | 343 | 1200 | LTCS/SS            | 631                | -                  | 3D     |
| 18"               | DN 450          | 957             | 586 | 372 | 1350 | LTCS/SS            | 935                | -                  | 3D     |
| 20"               | DN 500          | 1018            | 611 | 407 | 1500 | LTCS/SS            | 1190               | -                  | 3D     |
| 24"               | DN 600          | 1132            | 662 | 470 | 1800 | LTCS/SS            | -                  | 1311               | 3D     |
| 30"               | DN 750          | 1304            | 738 | 565 | 2250 | LTCS/SS            | -                  | 1932               | 3D     |
| 32"               | DN 800          | 1361            | 764 | 597 | 2400 | LTCS/SS            | -                  | 2266               | 3D     |
| 36"               | DN 900          | 1472            | 814 | 657 | 2700 | LTCS/SS            | -                  | 2956               | 3D     |
| 40"               | DN 1000         | 1526            | 865 | 661 | 3000 | LTCS/SS            | -                  | 3334               | 3D     |

**FLANGE RATING ANSI 600 IMPERIAL**

| Meter Size [inch] | Meter Size [mm] | Dimensions [inch] |         |         |          | Flow Cell Material | Weight Forged [lb] | Weight Welded [lb] | Length |
|-------------------|-----------------|-------------------|---------|---------|----------|--------------------|--------------------|--------------------|--------|
|                   |                 | A                 | B       | C       | L        |                    |                    |                    |        |
| 3"                | DN 80           | 20.7480           | 16.6142 | 5.7874  | 12.5984  | LTCS/SS            | 116.93             | -                  | 4D     |
| 4"                | DN 100          | 22.3622           | 16.9685 | 6.0236  | 15.7480  | LTCS/SS            | 179.79             | -                  | 4D     |
| 6"                | DN 150          | 23.9370           | 16.9291 | 7.2441  | 19.6850  | LTCS/SS            | 295.42             | -                  | 3.33D  |
| 8"                | DN 200          | 26.0630           | 17.7953 | 8.2677  | 23.6220  | LTCS/SS            | 441.85             | -                  | 3D     |
| 10"               | DN 250          | 28.7795           | 18.7795 | 10.0000 | 29.5276  | LTCS/SS            | 688.08             | -                  | 3D     |
| 12"               | DN 300          | 30.8661           | 19.8819 | 11.0236 | 35.4331  | LTCS/SS            | 934.56             | -                  | 3D     |
| 14"               | DN 350          | 32.9528           | 21.0630 | 12.2047 | 41.3386  | LTCS/SS            | 1084.7             | -                  | 3D     |
| 16"               | DN 400          | 35.5512           | 22.0866 | 13.5039 | 47.2441  | LTCS/SS            | 1391.1             | -                  | 3D     |
| 18"               | DN 450          | 37.6772           | 23.0709 | 14.6457 | 53.1496  | LTCS/SS            | 2061.3             | -                  | 3D     |
| 20"               | DN 500          | 40.0787           | 24.0551 | 16.0236 | 59.0551  | LTCS/SS            | 2623.5             | -                  | 3D     |
| 24"               | DN 600          | 44.5669           | 26.0630 | 18.5039 | 70.8661  | LTCS/SS            | -                  | 2890.37            | 3D     |
| 30"               | DN 750          | 51.3386           | 29.0551 | 22.2441 | 88.5827  | LTCS/SS            | -                  | 4259.22            | 3D     |
| 32"               | DN 800          | 53.5827           | 30.0787 | 23.5039 | 94.4882  | LTCS/SS            | -                  | 4995.65            | 3D     |
| 36"               | DN 900          | 57.9528           | 32.0472 | 25.8661 | 106.2992 | LTCS/SS            | -                  | 6515.85            | 3D     |
| 40"               | DN 1000         | 60.0787           | 34.0551 | 26.0236 | 118.1102 | LTCS/SS            | -                  | 7349.42            | 3D     |

**FLANGE RATING ANSI 900 METRIC**

| Meter Size [inch] | Meter Size [mm] | Dimensions [mm] |     |     |      | Flow Cell Material | Weight Forged [kg] | Weight Welded [kg] | Length |
|-------------------|-----------------|-----------------|-----|-----|------|--------------------|--------------------|--------------------|--------|
|                   |                 | A               | B   | C   | L    |                    |                    |                    |        |
| 3"                | DN 80           | 542             | 422 | 147 | 320  | LTCS/SS            | 62                 | -                  | 4D     |
| 4"                | DN 100          | 576             | 431 | 153 | 400  | LTCS/SS            | 89                 | -                  | 4D     |
| 6"                | DN 150          | 620             | 430 | 190 | 600  | LTCS/SS            | 167                | -                  | 4D     |
| 8"                | DN 200          | 687             | 452 | 235 | 800  | LTCS/SS            | 281                | -                  | 4D     |
| 10"               | DN 250          | 750             | 477 | 273 | 750  | LTCS/SS            | 360                | -                  | 3D     |
| 12"               | DN 300          | 810             | 505 | 305 | 900  | LTCS/SS            | 508                | -                  | 3D     |
| 14"               | DN 350          | 856             | 535 | 321 | 1050 | LTCS/SS            | 576                | -                  | 3D     |
| 16"               | DN 400          | 913             | 561 | 323 | 1200 | LTCS/SS            | 703                | -                  | 3D     |
| 18"               | DN 450          | 980             | 586 | 394 | 1350 | LTCS/SS            | 1070               | -                  | 3D     |
| 20"               | DN 500          | 1040            | 611 | 429 | 1500 | LTCS/SS            | 1250               | -                  | 3D     |
| 24"               | DN 600          | 1183            | 662 | 521 | 1800 | LTCS/SS            | -                  | 1918               | 3D     |
| 30"               | DN 750          | 1354            | 738 | 616 | 2250 | LTCS/SS            | -                  | 2929               | 3D     |
| 32"               | DN 800          | 1421            | 764 | 657 | 2400 | LTCS/SS            | -                  | 3444               | 3D     |
| 36"               | DN 900          | 1545            | 814 | 731 | 2700 | LTCS/SS            | -                  | 4493               | 3D     |
| 40"               | DN 1000         | 1621            | 865 | 756 | 3000 | LTCS/SS            | -                  | 5135               | 3D     |

**FLANGE RATING ANSI 900 IMPERIAL**

| Meter Size [inch] | Meter Size [mm] | Dimensions [inch] |         |         |          | Flow Cell Material | Weight Forged [lb] | Weight Welded [lb] | Length |
|-------------------|-----------------|-------------------|---------|---------|----------|--------------------|--------------------|--------------------|--------|
|                   |                 | A                 | B       | C       | L        |                    |                    |                    |        |
| 3"                | DN 80           | 21.3386           | 16.6142 | 5.7874  | 12.5984  | LTCS/SS            | 136.00             | -                  | 4D     |
| 4"                | DN 100          | 22.6772           | 16.9685 | 6.0236  | 15.7480  | LTCS/SS            | 196.83             | -                  | 4D     |
| 6"                | DN 150          | 24.4094           | 16.9291 | 7.4803  | 23.6220  | LTCS/SS            | 367.29             | -                  | 4D     |
| 8"                | DN 200          | 27.0472           | 17.7953 | 9.2520  | 31.4961  | LTCS/SS            | 619.68             | -                  | 4D     |
| 10"               | DN 250          | 29.5276           | 18.7795 | 10.7480 | 29.5276  | LTCS/SS            | 792.98             | -                  | 3D     |
| 12"               | DN 300          | 31.8898           | 19.8819 | 12.0079 | 35.4331  | LTCS/SS            | 1120.68            | -                  | 3D     |
| 14"               | DN 350          | 33.7008           | 21.0630 | 12.6378 | 41.3386  | LTCS/SS            | 1269.9             | -                  | 3D     |
| 16"               | DN 400          | 35.9449           | 22.0866 | 12.7165 | 47.2441  | LTCS/SS            | 1549.8             | -                  | 3D     |
| 18"               | DN 450          | 38.5827           | 23.0709 | 15.5118 | 53.1496  | LTCS/SS            | 2358.9             | -                  | 3D     |
| 20"               | DN 500          | 40.9449           | 24.0551 | 16.8898 | 59.0551  | LTCS/SS            | 2755.8             | -                  | 3D     |
| 24"               | DN 600          | 46.5748           | 26.0630 | 20.5118 | 70.8661  | LTCS/SS            | -                  | 4228.09            | 3D     |
| 30"               | DN 750          | 53.3071           | 29.0551 | 24.2520 | 88.5827  | LTCS/SS            | -                  | 6457.76            | 3D     |
| 32"               | DN 800          | 55.9449           | 30.0787 | 25.8661 | 94.4882  | LTCS/SS            | -                  | 7593.07            | 3D     |
| 36"               | DN 900          | 60.8268           | 32.0472 | 28.7795 | 106.2992 | LTCS/SS            | -                  | 9905.28            | 3D     |
| 40"               | DN 1000         | 63.8189           | 34.0551 | 29.7638 | 118.1102 | LTCS/SS            | -                  | 11320.72           | 3D     |


**FLANGE RATING ANSI 1500 METRIC**

| Meter Size [inch] | Meter Size [mm] | Dimensions [mm] |     |     |      | Flow Cell Material | Weight Forged [kg] | Weight Welded [kg] | Length |
|-------------------|-----------------|-----------------|-----|-----|------|--------------------|--------------------|--------------------|--------|
|                   |                 | A               | B   | C   | L    |                    |                    |                    |        |
| 3"                | DN 1500         | 555             | 422 | 147 | 400  | LTCS/SS            | 78                 | -                  | 5D     |
| 4"                | DN 1500         | 586             | 431 | 155 | 500  | LTCS/SS            | 114                | -                  | 5D     |
| 6"                | DN 1500         | 628             | 430 | 198 | 600  | LTCS/SS            | 203                | -                  | 4D     |
| 8"                | DN 1500         | 695             | 452 | 243 | 800  | LTCS/SS            | 342                | -                  | 4D     |
| 10"               | DN 1500         | 770             | 477 | 293 | 1000 | LTCS/SS            | 510                | -                  | 4D     |
| 12"               | DN 1500         | 842             | 523 | 338 | 1200 | LTCS/SS            | 772                | -                  | 4D     |
| 14"               | DN 1500         | 898             | 543 | 375 | 1400 | LTCS/SS            | 960                | -                  | 4D     |
| 16"               | DN 1500         | 956             | 561 | 413 | 1600 | LTCS/SS            | 1310               | -                  | 4D     |
| 18"               | DN 1500         | 1033            | 576 | 458 | 1800 | LTCS/SS            | 1960               | -                  | 4D     |
| 20"               | DN 1500         | 1090            | 597 | 493 | 2000 | LTCS/SS            | 2360               | -                  | 4D     |
| 24"               | DN 1500         | 1247            | 662 | 585 | 2400 | LTCS/SS            | -                  | 3526               | 4D     |

**FLANGE RATING ANSI 1500 IMPERIAL**

| Meter Size [inch] | Meter Size [mm] | Dimensions [inch] |       |       |       | Flow Cell Material | Weight Forged [lb] | Weight Welded [lb] | Length |
|-------------------|-----------------|-------------------|-------|-------|-------|--------------------|--------------------|--------------------|--------|
|                   |                 | A                 | B     | C     | L     |                    |                    |                    |        |
| 3"                | DN 1500         | 21.85             | 16.61 | 5.787 | 15.75 | LTCS/SS            | 172.0              | -                  | 5D     |
| 4"                | DN 1500         | 23.07             | 16.97 | 6.102 | 19.69 | LTCS/SS            | 251.0              | -                  | 5D     |
| 6"                | DN 1500         | 24.72             | 16.93 | 7.795 | 23.62 | LTCS/SS            | 448.1              | -                  | 4D     |
| 8"                | DN 1500         | 27.36             | 17.8  | 9.567 | 31.5  | LTCS/SS            | 753.2              | -                  | 4D     |
| 10"               | DN 1500         | 30.31             | 18.78 | 11.54 | 39.37 | LTCS/SS            | 1124.4             | -                  | 4D     |
| 12"               | DN 1500         | 33.15             | 19.88 | 13.31 | 47.24 | LTCS/SS            | 1702.0             | -                  | 4D     |
| 14"               | DN 1500         | 35.35             | 20.59 | 14.76 | 55.12 | LTCS/SS            | 2116.4             | -                  | 4D     |
| 16"               | DN 1500         | 37.64             | 21.38 | 16.26 | 62.99 | LTCS/SS            | 2888.1             | -                  | 4D     |
| 18"               | DN 1500         | 40.67             | 22.68 | 18.03 | 70.87 | LTCS/SS            | 4321.1             | -                  | 4D     |
| 20"               | DN 1500         | 42.91             | 23.5  | 19.41 | 78.74 | LTCS/SS            | 5202.9             | -                  | 4D     |
| 24"               | DN 1500         | 49.09             | 26.06 | 23.03 | 94.49 | LTCS/SS            | -                  | 7772.8             | 4D     |

# Q.Sonic<sup>plus</sup> Technical Specifications

| TECHNICAL DATA                           |   |
|--|---|
| Measurement Principle                    | Ultrasonic transit time measurement   |
| Sizes                                    | 3" to 36" –larger sizes available upon request (DN 80 to DN 900)  |
| Pressure range                           | 2 bar (g) (29 psig) to 250 bar (g) (3625 psig); minimum pressure depending on size and gas composition  |
| Process Temperature Ranges <sup>4)</sup> | Standard: -40°C to +85°C (-40°F to +185°F)<br>Extended: -50°C to +85°C (-58°F to +185°F)<br>MID: -40°C to +85°C (-40°F to +185°F)   |
| Ambient Temperature Range <sup>4)</sup>  | Standard: -40°C to +70°C (-40°F to +158°F)<br>Extended: -50°C to +70°C (-58°F to +158°F)<br>MID: -40°C to +55°C (-40°F to +131°F)   |
| Repeatability                            | 0.05% <sup>1)</sup>   |
| Typical Uncertainty                      | 0.5% of reading after dry calibration <sup>2)</sup><br>0.2% of reading after flow calibration <sup>2)</sup><br>0.1% of reading after flow calibration and linearization <sup>2)</sup>   |
| Body Materials                           | Low-temperature carbon steel<br>≤ 12": ASTM A350-LF2 Cl.1<br>≥ 14": ASTM A333 grade 6/ASTM A350-LF2 Cl.1<br>Stainless steel<br>≤ 12": ASTM A182-F316<br>≥ 14": ASTM A312-TP316L/ASTM A182-F316L<br>Other materials on request   |
| Material Certificate                     | EN 10204 3.1 (3.2 on request)   |
| Body Construction Details                | ≤ 16": reduced bore, tapering angle 7°<br>≥ 18": full bore  |
| Pressure Reference Points                | ½" NPT (G½ on request)  |
| Electronic Enclosure Material            | Cast aluminium alloy. Optional 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" (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)<br>- 1 Ethernet port/high-speed VDSL (VDSL option replaces Ethernet port)<br>- 2 frequency outputs, 0 to 3 kHz<br>- 2 digital outputs <sup>3)</sup><br>- 2 analogue outputs <sup>3)</sup><br>- 1 USB port (device, for service purpose only) |
| Communications Protocol                  | - Modbus (ASCII, RTU, TCP/IP)<br>- UNIFORM<br>- UNIFORM Series IV 4-path compatibility mode<br>- MMS (Manufacturing Message Specification)<br>- Built-in web server   |
| Metrological Approval                    | MID T10335 (optional)   |
| MID Accuracy                             | Class 1.0   |
| Hazardous Area Approvals                 | ATEX:  II 2 G Ex d ia [ia] IIB+H2 T6 Gb<br>IECEX: Ex d ia [ia] IIB+H2 T6 Gb<br>FM: Class I, Division 1, Group A to D T6<br>CSA: Class I, Division 1, Groups B, C and D T6; Ex d ia [ia] IIB+H2 T6    |
| Ingress Protection                       | IP 66/NEMA Type 4X  |

<sup>1)</sup>  $Q_t$  to  $Q_{max}$

<sup>2)</sup>  $Q_t$  to  $Q_{max}$  with straight inlet/outlet spool of 10D/3D

<sup>3)</sup> Analogue outputs and digital outputs sharing the terminal clamps

<sup>4)</sup> Ranges: subject to application and (hazardous area) approval

## For more information

To learn more about Honeywell's Integrated Gas Solutions, visit [www.honeywellprocess.com](http://www.honeywellprocess.com) or contact your Honeywell account manager.

## Honeywell Process Solutions

Honeywell House, Arlington Business Park  
Bracknell, Berkshire, England RG12 1EB

1250 West Sam Houston Parkway South  
Houston, TX 77042 USA Tel: +1 832 252 3000

33F, Tower A, Shanghai City Centre 100 Zunyi  
Road, Shanghai, China 200051  
[www.honeywellprocess.com](http://www.honeywellprocess.com)

Germany Elster GmbH Steinern Straße 19-21  
55252 Mainz-Kastel  
[www.elster-instromet.com](http://www.elster-instromet.com)

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