



HIGH ACCURACY

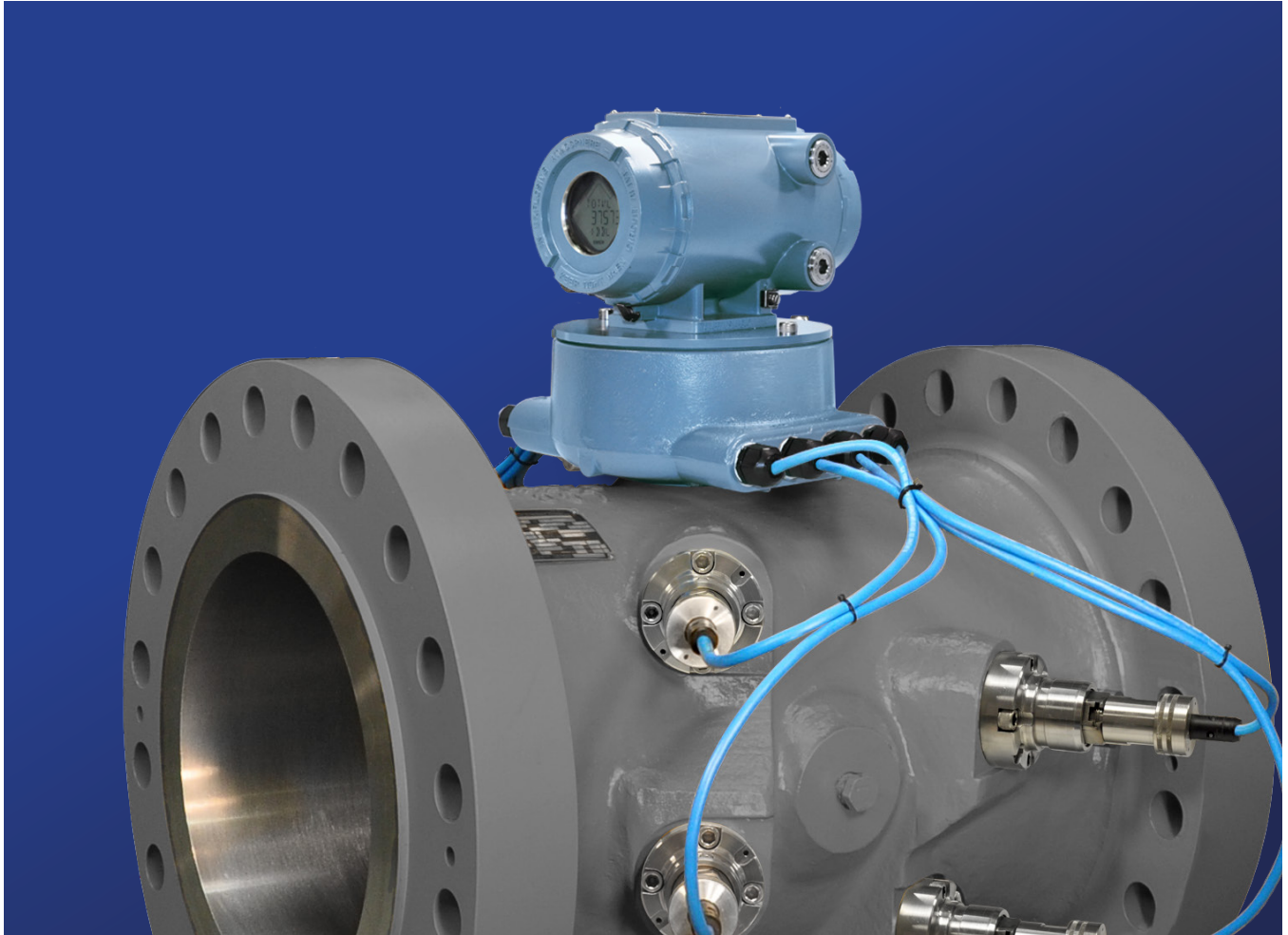
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PRODUCT DATASHEET

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Daniel™ SeniorSonic™ 3414

Four-Path Gas Ultrasonic Flow Meter



SeniorSonic 3414 Gas Ultrasonic Flow Meter

Intelligence for Custody Transfer

Engineered for custody transfer applications, the Daniel SeniorSonic 3414 Four-Path Gas Ultrasonic Flow Meter offers high accuracy and reliable, long-term performance to minimize lost and unaccounted for natural gas. The advanced meter is available in DN100 to DN1050 (4-in to 42-in)⁽¹⁾ line sizes and offers bi-directional flow capabilities, increased flow capacity and no incremental pressure drop to reduce measurement risk and minimize operating costs.

Powerful next-generation Daniel 3410 Series Electronics work with the SeniorSonic 3414 meter to significantly increase the sampling rate and provide high-volume data capture, including extensive hourly and daily logs. The streamlined electronics feature a plug-in ready, integrated CPU and I/O board assembly and a local LCD display (optional) to increase reliability, simplify maintenance and facilitate future expansion. Operators can also easily monitor and troubleshoot the meters in real time from a PC or laptop. Daniel MeterLink™ Diagnostics Software is an intuitive user interface that provides critical information, including expert flow analysis, flow disturbance alerts and suggested corrective actions, to enhance reliability and improve functionality.

The SeniorSonic 3414 meter is also supplied with rugged Daniel T-20 Series Transducers that ensure reliable measurement in harsh environments where wet, rich and/or dirty gas is present. The transducers are engineered to simplify servicing and maximize meter uptime.

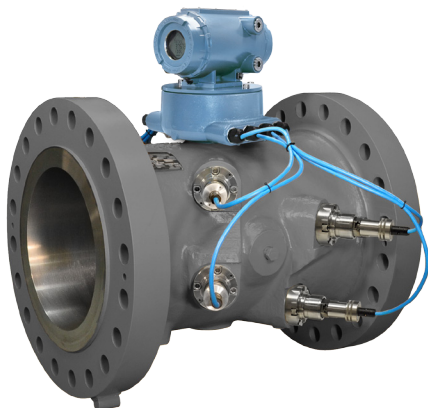


Figure 1: Daniel SeniorSonic 3414 Gas Ultrasonic Flow Meter

(1) Consult factory on meter sizes above DN900 (36-in).

(2) Requires a Continuous Flow Analysis software key.

Typical Application

- Custody transfer for natural gas transmission lines

Application Sites

- Power plants – inlets
- Gas processing plants – inlets/outlets
- Underground storage sites – inlets/outlets
- Gas production – onshore/offshore
- City gate stations – receipt/delivery points

Features and Benefits

- Four-path chordal design allows accuracy, stability, redundancy and operational cost savings
- Excellent long-term performance reduces maintenance costs
- High rangeability of >100:1 ensures fewer meter runs, smaller line sizes and lower capital costs
- Cast or forged body construction minimizes measurement uncertainty caused by pressure changes
- Extractable Daniel T-20 Series Transducers offer ease of inspection, cleaning and/or replacement; field replaceable transformer module
- 3410 Series Electronics provide fast sampling, an expandable electronics platform and an archive data log containing pressure, temperature and gas composition information which allows the meter to act as a redundant flow computer
- 3410 Series Electronics calculate corrected volume rates, mass rates and energy rates
- 3410 Series Electronics calculate speed of sound from pressure, temperature, and gas composition data (AGA 10 2008, AGA 8 Part 1 & 2 2017, GERG-2008)
- Local LCD display (optional) with up to nine user-selectable scrolling variables
- Daniel MeterLink Diagnostics Software allows access to expert flow analysis and provides an intuitive view of meter health; calibration cycles can be extended to minimize operating and maintenance costs⁽²⁾
- Predictive diagnostics allow plant personnel to quickly detect and respond to abnormal situations to avoid process upsets and unscheduled downtime
- The Daniel SeniorSonic 3414 meter is part of Emerson's broad range of intelligent field devices that power the PlantWeb® digital plant architecture

Standard Specifications

Please consult a Daniel technical specialist if requirements are outside of the listed specifications. Other product and material offerings may be available depending on the application.

Meter Specifications

Characteristics

- Four-path (eight transducer) chordal design

Meter Performance

- Flow calibrated accuracy is $\pm 0.1\%$ of reading over entire flow calibration range
- Repeatability is $\pm 0.05\%$ of reading for 1.5 to 30.5 m/s (5 to 100 ft/s)

Velocity Range

- Nominal 0 to 30 m/s (0 to 100 fps) with over-range performance exceeding 38 m/s (125 fp/s) on some sizes
- Meter meets or exceeds AGA 8 2017 Part 1 & 2 (3rd Edition) / ISO 17089 performance specifications

Table 1A: AGA 9 / ISO 17089 Flow Rate Values
(Metric Units)

| Meter Size (DN) | 100 to 600 | 750 | 900 |
|-----------------|------------|-------|-------|
| q_{min} (m/s) | 0.5 | 0.5 | 0.5 |
| q_t (m/s) | 3.048 | 2.591 | 2.29 |
| q_{max} (m/s) | 30.48 | 25.91 | 22.86 |

Table 1B: AGA 9 / ISO 17089 Flow Rate Values
(US Customary Units)

| Meter Size (in) | 4 to 24 | 30 | 36 |
|------------------|---------|-----|-----|
| q_{min} (ft/s) | 1.7 | 1.7 | 1.7 |
| q_t (ft/s) | 10 | 8.5 | 7.5 |
| q_{max} (ft/s) | 100 | 85 | 75 |

Electronics Performance

Power

- 10.4 VDC to 36 VDC
- 8 watts typical; 15 watts maximum

Mechanical Ratings

Line Sizes

- DN100 to DN1050 (4-in to 42-in)⁽¹⁾
- DN100 to DN150 (4-in to 6-in) are 45° dual X orientation
- DN200 (8-in) and larger are British Gas (BG) orientation

Operating Gas Temperature (Transducers)

- T-21: -20°C to +100°C (-4°F to +212°F)
- T-41: -50°C to +100°C (-58°F to +212°F)
- T-22: -50°C to +100°C (-58°F to +212°F)

Operating Pressure Range (Transducers)

- T-21/T-41/T-22: 689 to 27,579 kPag (100 to 4,000 psig)
- T-21/T-41/T-22: 345 kPag (50 psig) available with reduced Q_{max} ⁽²⁾
- T-22: 0 to 689 kPag (0 to 100 psig)⁽³⁾

Flanges

- Raised Face and Ring Type Joint (RTJ) for PN 50 to 420 (ANSI Classes 300 to 2,500)
- Compact flanges and hub end connectors (optional)

NACE, NORSOK and PED Compliance

- Designed for NACE compliance⁽⁴⁾
- NORSOK available upon request
- PED available upon request

Electronics Ratings

Operating Temperature

- 40°C to +60°C (-40°F to +140°F)

Operating Relative Humidity

- Up to 95% non-condensing

Storage Temperature

- 40°C to +85°C (-40°F to +185°F) with a low temperature storage limit of -20°C (-4°F) for T-21 transducers and -50°C (-58°F) for T-41/T-22 transducers

Electronic Housing Options

- Integral mount (standard)
- Remote mount (optional) with 4.6 m (15 ft) cable
 - Required for process temperature above +60°C

(1) Consult factory on meter sizes above DN900 (36-in).

(2) Refer to page 9 for additional information pertaining to operation limits.

(3) For low pressure applications below 689 kPag (0 psig), the meter must be equipped with isolated transducer mounts.

(4) It is the equipment user's responsibility to select the materials suitable for the intended services.

Materials of Construction

Material Specifications

Body and Flange

Cast

- ASTM A352 Gr LCC Carbon Steel⁽¹⁾
-46°C to +150°C (-50°F to +302°F)
- ASTM A351 Gr CF8M 316 Stainless Steel
-46°C to +150°C (-50°F to +302°F)
- ASTM A351 Gr CF8M 316L Stainless Steel
-46°C to +150°C (-50°F to +302°F)
- ASTM A995 Gr 4A Duplex Stainless Steel⁽²⁾
-50°C to +150°C (-58°F to +302°F)

Forgings

- ASTM A350 Gr LF2 Carbon Steel⁽¹⁾
-46°C to +150°C (-50°F to +302°F)
- ASTM A182 Gr F316 Stainless Steel
-46°C to +150°C (-50°F to +302°F)
- ASTM A182 Gr F316L Stainless Steel
-46°C to +150°C (-50°F to +302°F)
- ASTM A182 Gr F51 Duplex Stainless Steel⁽²⁾
-50°C to +150°C (-58°F to +302°F)
- ASTM A105 Carbon Steel
-29°C to +150°C (-20°F to +302°F)

Enclosure Housing

- Standard: ASTM B26 Gr A356.0 T6 Aluminum
- Optional: ASTM A351 Gr CF8M Stainless Steel
- Optional: (retrofit): ASTM B26-92A Aluminum

Transducer Components

Transducer Mounts and Holders O-rings

- Standard: Nitrile Butadiene Rubber (NBR)
- Other materials available

Transducer Mounts and Holders

- ASTM A564 Type 630 Stainless Steel Mounts
- ASTM A479 316L Stainless Steel Holders
- INCONEL® ASTM B446 (UNS N06625) Gr 1 Mount (optional)
- INCONEL ASTM B446 (UNS N06625) Gr 1 Holder (optional)

Paint Specifications

Body and Flange Exterior

Carbon Steel Body Material

- 2 coat paint; zinc primer and acrylic lacquer topcoat (standard)

Stainless Steel or Duplex Body Material

- Paint (optional)

Enclosure Housing

Aluminum Material

- Standard: 100% conversion coated and exterior coated with a polyurethane enamel
- Optional (retrofit): 100% conversion coated and exterior coated with a polyurethane enamel

Stainless Steel Material

- Optional: Passivated

Table 2A: Body and Flange Maximum Pressure Ratings by Construction Materials
[bar Meter Sizes DN100 to DN1050]⁽³⁾

| PN | Cast Carbon Steel | Forged Carbon Steel | Cast 316 SS, 316L SS, Forged 316 SS | Forged 316L SS | Duplex SS |
|-----|-------------------|---------------------|-------------------------------------|----------------|-----------|
| 50 | 51.7 | 51.1 | 49.6 | 41.4 | 51.7 |
| 100 | 103.4 | 102.1 | 99.3 | 82.7 | 103.4 |
| 150 | 155.1 | 153.2 | 148.9 | 124.1 | 155.1 |
| 200 | 258.6 | 255.3 | 248.2 | 206.8 | 258.6 |
| 250 | 430.9 | 425.5 | 413.7 | 344.7 | 430.9 |

Table 2B: Body and Flange Maximum Pressure Ratings by Construction Materials
[psi Meter Sizes 4-in to 42-in]⁽³⁾

| ANSI Class ⁽⁴⁾ | Cast Carbon Steel | Forged Carbon Steel | Cast 316 SS, 316L SS, Forged 316 SS | Forged 316L SS | Duplex SS |
|---------------------------|-------------------|---------------------|-------------------------------------|----------------|-----------|
| 300 | 750 | 740 | 720 | 600 | 750 |
| 600 | 1,500 | 1,480 | 1,440 | 1,200 | 1,500 |
| 900 | 2,250 | 2,220 | 2,160 | 1,800 | 2,250 |
| 1,500 | 3,750 | 3,705 | 3,600 | 3,000 | 3,750 |
| 2,500 | 6,250 | 6,170 | 6,000 | 5,000 | 6,250 |

(1) Impact tested per specified ASTM standard.

(2) A995 4A material is not yet approved in Canada.

(3) Pressure rating information is for -29°C to +38°C (-20°F to +100°F). Other temperatures may reduce the maximum pressure rating of the materials.

Meter Sizing: Metric Units

Tables 3A and 3B can be used to determine the flow range at reference conditions for all meter sizes. All calculations are based on Schedule 40 bore, +15°C and typical gas composition (AGA 8 Amarillo). These values are intended to be a guide in sizing.

Calculating Meter Capacity

To calculate a volume rate for a given velocity, first find the capacity (flow rate) in table 3A for the meter size and operating pressure. Next, multiply the capacity by the ratio of the desired velocity divided by 30.5 m/s to obtain the desired volume rate.

Example: Determine the hourly flow rate at 21 m/s for a DN200 meter operating at 4,500 kPag.

$$\text{Flow Rate} = 178 \text{ MSCMH} \quad \text{Velocity} = 21 \text{ m/s} \quad \text{Answer} = \frac{178 \text{ MSCMH} \times 21 \text{ m/s}}{30.5 \text{ m/s}} = 122.6 \text{ MSCMH}$$

| Table 3A: Flow Rates (MSCMH) | | | | | | | | | | | | |
|--|-------|-----|-----|-----|-----|-------|-------|-------|-------|-------|-------|-------|
| Based Upon Max Rated Velocity [DN100 to DN600 = 30.5 m/s] [750 mm = 25.9 m/s] [DN900 = 22.9 m/s] | | | | | | | | | | | | |
| Meter Size (DN) | 100 | 150 | 200 | 250 | 300 | 400 | 450 | 500 | 600 | 750 | 900 | |
| Operating Pressure (kPag) | 1,000 | 10 | 23 | 39 | 62 | 88 | 139 | 175 | 218 | 315 | 432 | 550 |
| | 1,500 | 15 | 33 | 58 | 91 | 129 | 204 | 258 | 320 | 463 | 635 | 809 |
| | 2,000 | 19 | 44 | 77 | 121 | 171 | 270 | 342 | 425 | 615 | 843 | 1,074 |
| | 2,500 | 24 | 55 | 96 | 151 | 214 | 339 | 429 | 533 | 770 | 1,056 | 1,345 |
| | 3,000 | 29 | 67 | 116 | 182 | 259 | 408 | 517 | 642 | 929 | 1,274 | 1,622 |
| | 3,500 | 35 | 78 | 136 | 214 | 304 | 480 | 607 | 754 | 1,091 | 1,496 | 1,905 |
| | 4,000 | 40 | 90 | 156 | 247 | 350 | 553 | 700 | 869 | 1,257 | 1,724 | 2,195 |
| | 4,500 | 45 | 103 | 178 | 280 | 397 | 627 | 794 | 987 | 1,427 | 1,957 | 2,491 |
| | 5,000 | 51 | 115 | 199 | 314 | 446 | 704 | 891 | 1,107 | 1,600 | 2,195 | 2,794 |
| | 5,500 | 56 | 128 | 221 | 349 | 495 | 781 | 989 | 1,229 | 1,778 | 2,438 | 3,104 |
| | 6,000 | 62 | 141 | 244 | 384 | 545 | 861 | 1,090 | 1,354 | 1,959 | 2,686 | 3,420 |
| | 6,500 | 68 | 154 | 267 | 420 | 597 | 942 | 1,193 | 1,482 | 2,143 | 2,939 | 3,742 |
| | 7,000 | 74 | 168 | 290 | 457 | 649 | 1,025 | 1,297 | 1,612 | 2,331 | 3,197 | 4,071 |
| | 7,500 | 80 | 181 | 314 | 495 | 702 | 1,109 | 1,404 | 1,744 | 2,523 | 3,460 | 4,405 |
| | 8,000 | 86 | 195 | 338 | 533 | 757 | 1,195 | 1,512 | 1,879 | 2,718 | 3,727 | 4,745 |
| | 8,500 | 92 | 209 | 363 | 572 | 812 | 1,281 | 1,622 | 2,015 | 2,915 | 3,997 | 5,090 |
| 9,000 | 99 | 224 | 388 | 611 | 867 | 1,369 | 1,733 | 2,154 | 3,115 | 4,272 | 5,439 | |
| 9,500 | 105 | 238 | 413 | 651 | 924 | 1,458 | 1,846 | 2,294 | 3,318 | 4,550 | 5,793 | |
| 10,000 | 112 | 253 | 438 | 691 | 981 | 1,548 | 1,960 | 2,435 | 3,522 | 4,830 | 6,149 | |

| Table 3B: Flow Rates (MMSCMD) | | | | | | | | | | | | |
|--|-------|-------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|
| Based Upon Max Rated Velocity [DN100 to DN600 = 30.5 m/s] [750 mm = 25.9 m/s] [DN900 = 22.9 m/s] | | | | | | | | | | | | |
| Meter Size (DN) | 100 | 150 | 200 | 250 | 300 | 400 | 450 | 500 | 600 | 750 | 900 | |
| Operating Pressure (kPag) | 1,000 | 0.240 | 0.544 | 0.941 | 1.484 | 2.106 | 3.325 | 4.208 | 5.229 | 7.563 | 10.372 | 13.205 |
| | 1,500 | 0.352 | 0.799 | 1.384 | 2.182 | 3.097 | 4.889 | 6.188 | 7.690 | 11.122 | 15.251 | 19.418 |
| | 2,000 | 0.467 | 1.061 | 1.837 | 2.895 | 4.110 | 6.489 | 8.213 | 10.206 | 14.761 | 20.242 | 25.773 |
| | 2,500 | 0.585 | 1.328 | 2.300 | 3.626 | 5.147 | 8.126 | 10.285 | 12.780 | 18.485 | 25.348 | 32.273 |
| | 3,000 | 0.706 | 1.602 | 2.774 | 4.373 | 6.207 | 9.800 | 12.404 | 15.414 | 22.293 | 30.571 | 38.923 |
| | 3,500 | 0.829 | 1.882 | 3.259 | 5.137 | 7.292 | 11.512 | 14.572 | 18.107 | 26.189 | 35.914 | 45.725 |
| | 4,000 | 0.956 | 2.168 | 3.755 | 5.919 | 8.401 | 13.264 | 16.789 | 20.862 | 30.174 | 41.378 | 52.682 |
| | 4,500 | 1.085 | 2.461 | 4.262 | 6.718 | 9.536 | 15.055 | 19.056 | 23.679 | 34.248 | 46.964 | 59.795 |
| | 5,000 | 1.216 | 2.760 | 4.780 | 7.535 | 10.695 | 16.885 | 21.373 | 26.558 | 38.412 | 52.674 | 67.065 |
| | 5,500 | 1.351 | 3.066 | 5.309 | 8.369 | 11.880 | 18.755 | 23.740 | 29.499 | 42.665 | 58.508 | 74.492 |
| | 6,000 | 1.489 | 3.378 | 5.850 | 9.221 | 13.089 | 20.664 | 26.156 | 32.502 | 47.009 | 64.463 | 82.075 |
| | 6,500 | 1.629 | 3.697 | 6.401 | 10.090 | 14.322 | 22.612 | 28.621 | 35.565 | 51.439 | 70.538 | 89.810 |
| | 7,000 | 1.772 | 4.021 | 6.963 | 10.975 | 15.579 | 24.596 | 31.133 | 38.686 | 55.953 | 76.729 | 97.692 |
| | 7,500 | 1.917 | 4.351 | 7.535 | 11.877 | 16.859 | 26.616 | 33.690 | 41.863 | 60.549 | 83.031 | 105.716 |
| | 8,000 | 2.065 | 4.687 | 8.116 | 12.793 | 18.160 | 28.670 | 36.290 | 45.094 | 65.221 | 89.438 | 113.873 |
| | 8,500 | 2.215 | 5.028 | 8.706 | 13.723 | 19.480 | 30.754 | 38.928 | 48.372 | 69.962 | 95.940 | 122.151 |
| 9,000 | 2.368 | 5.373 | 9.304 | 14.666 | 20.818 | 32.866 | 41.601 | 51.694 | 74.766 | 102.528 | 130.539 | |
| 9,500 | 2.521 | 5.722 | 9.909 | 15.619 | 22.170 | 35.002 | 44.304 | 55.053 | 79.625 | 109.190 | 139.021 | |
| 10,000 | 2.677 | 6.075 | 10.519 | 16.580 | 23.535 | 37.157 | 47.032 | 58.442 | 84.527 | 115.913 | 147.581 | |

Meter Sizing: US Customary Units

Tables 4A and 4B can be used to determine the flow range at reference conditions for all meter sizes. All calculations are based on Schedule 40 bore, +60°F and typical gas composition (AGA 8 Amarillo). These values are intended to be a guide in sizing.

Calculating Meter Capacity

To calculate a volume rate for a given velocity, first find the capacity (flow rate) in table 4A for the meter size and operating pressure. Next, multiply the capacity by the ratio of the desired velocity divided by 100 ft/s to obtain the desired volume rate.

Example: Determine the hourly flow rate at 70 ft/s for an 8-inch meter operating at 800 psig.

$$\text{Flow Rate} = 7,842 \text{ MSCFH} \quad \text{Velocity} = 70 \text{ ft/s} \quad \text{Answer} = \frac{7,842 \text{ MSCFH} \times 70 \text{ ft/s}}{100 \text{ ft/s}} = 5,489.4 \text{ MSCFH}$$

Table 4A: Flow Rates (MSCFH)
Based Upon Max Rated Velocity [4-in to 24-in = 100 ft/s] [30-in = 85 ft/s] [36-in = 75 ft/s]

| Meter Size (in) | 4 | 6 | 8 | 10 | 12 | 16 | 18 | 20 | 24 | 30 | 36 |
|-----------------|-------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
| 100 | 252 | 571 | 989 | 1,559 | 2,213 | 3,494 | 4,423 | 5,495 | 7,948 | 10,910 | 13,862 |
| 200 | 478 | 1,086 | 1,880 | 2,963 | 4,207 | 6,641 | 8,406 | 10,446 | 15,108 | 20,738 | 26,349 |
| 300 | 712 | 1,616 | 2,799 | 4,412 | 6,263 | 9,888 | 12,515 | 15,552 | 22,493 | 30,875 | 39,229 |
| 400 | 954 | 2,164 | 3,747 | 5,906 | 8,384 | 13,236 | 16,754 | 20,819 | 30,111 | 41,331 | 52,515 |
| 500 | 1,202 | 2,729 | 4,725 | 7,448 | 10,572 | 16,690 | 21,126 | 26,251 | 37,968 | 52,117 | 66,219 |
| 600 | 1,459 | 3,311 | 5,733 | 9,037 | 12,828 | 20,252 | 25,635 | 31,854 | 46,071 | 63,239 | 80,350 |
| 700 | 1,723 | 3,911 | 6,772 | 10,675 | 15,153 | 23,923 | 30,281 | 37,627 | 54,422 | 74,701 | 94,914 |
| 800 | 1,996 | 4,529 | 7,842 | 12,362 | 17,547 | 27,703 | 35,065 | 43,572 | 63,020 | 86,504 | 109,910 |
| 900 | 2,276 | 5,165 | 8,943 | 14,096 | 20,009 | 31,590 | 39,986 | 49,686 | 71,863 | 98,642 | 125,333 |
| 1,000 | 2,563 | 5,817 | 10,073 | 15,877 | 22,537 | 35,581 | 45,038 | 55,964 | 80,943 | 111,105 | 141,169 |
| 1,100 | 2,858 | 6,486 | 11,231 | 17,702 | 25,128 | 39,671 | 50,214 | 62,396 | 90,246 | 123,875 | 157,394 |
| 1,200 | 3,159 | 7,169 | 12,414 | 19,567 | 27,774 | 43,850 | 55,504 | 68,969 | 99,752 | 136,923 | 173,973 |
| 1,300 | 3,466 | 7,865 | 13,619 | 21,467 | 30,471 | 48,107 | 60,893 | 75,665 | 109,437 | 150,217 | 190,865 |
| 1,400 | 3,777 | 8,571 | 14,842 | 23,395 | 33,208 | 52,428 | 66,362 | 82,462 | 119,267 | 163,711 | 208,009 |
| 1,500 | 4,092 | 9,285 | 16,079 | 25,344 | 35,975 | 56,797 | 71,892 | 89,333 | 129,205 | 177,352 | 225,341 |
| 1,600 | 4,408 | 10,004 | 17,323 | 27,306 | 38,760 | 61,193 | 77,456 | 96,247 | 139,205 | 191,079 | 242,782 |
| 1,700 | 4,725 | 10,724 | 18,570 | 29,270 | 41,548 | 65,595 | 83,029 | 103,172 | 149,221 | 204,826 | 260,250 |
| 1,800 | 5,041 | 11,441 | 19,811 | 31,227 | 44,326 | 69,981 | 88,580 | 110,069 | 159,197 | 218,520 | 277,649 |
| 1,900 | 5,354 | 12,151 | 21,041 | 33,166 | 47,079 | 74,327 | 94,081 | 116,905 | 169,083 | 232,090 | 294,891 |
| 2,000 | 5,663 | 12,852 | 22,255 | 35,079 | 49,793 | 78,612 | 99,505 | 123,645 | 178,832 | 245,472 | 311,894 |

Table 4B: Flow Rates (MMSCFD)
Based Upon Max Rated Velocity [4-in to 24-in = 100 ft/s] [30-in = 85 ft/s] [36-in = 75 ft/s]

| Meter Size (in) | 4 | 6 | 8 | 10 | 12 | 16 | 18 | 20 | 24 | 30 | 36 |
|-----------------|-------|-------|-------|-------|---------|---------|---------|---------|---------|---------|---------|
| 100 | 6.0 | 13.7 | 23.7 | 37.4 | 53.1 | 83.9 | 106.1 | 131.9 | 190.8 | 261.8 | 332.7 |
| 200 | 11.5 | 26.1 | 45.1 | 71.1 | 101.0 | 159.4 | 201.8 | 250.7 | 362.6 | 497.7 | 632.4 |
| 300 | 17.1 | 38.8 | 67.2 | 105.9 | 150.3 | 237.3 | 300.4 | 373.2 | 539.8 | 741.0 | 941.5 |
| 400 | 22.9 | 51.9 | 89.9 | 141.8 | 201.2 | 317.7 | 402.1 | 499.6 | 722.7 | 991.9 | 1,260.4 |
| 500 | 28.9 | 65.5 | 113.4 | 178.7 | 253.7 | 400.6 | 507.0 | 630.0 | 911.2 | 1,250.8 | 1,589.3 |
| 600 | 35.0 | 79.5 | 137.6 | 216.9 | 307.9 | 486.1 | 615.2 | 764.5 | 1,105.7 | 1,517.7 | 1,928.4 |
| 700 | 41.4 | 93.9 | 162.5 | 256.2 | 363.7 | 574.2 | 726.7 | 903.1 | 1,306.1 | 1,792.8 | 2,277.9 |
| 800 | 47.9 | 108.7 | 188.2 | 296.7 | 421.1 | 664.9 | 841.6 | 1,045.7 | 1,512.5 | 2,076.1 | 2,637.8 |
| 900 | 54.6 | 123.9 | 214.6 | 338.3 | 480.2 | 758.2 | 959.7 | 1,192.5 | 1,724.7 | 2,367.4 | 3,008.0 |
| 1,000 | 61.5 | 139.6 | 241.7 | 381.1 | 540.9 | 854.0 | 1,080.9 | 1,343.1 | 1,942.6 | 2,666.5 | 3,388.1 |
| 1,100 | 68.6 | 155.7 | 269.5 | 424.8 | 603.1 | 952.1 | 1,205.1 | 1,497.5 | 2,165.9 | 2,973.0 | 3,777.5 |
| 1,200 | 75.8 | 172.1 | 297.9 | 469.6 | 666.6 | 1,052.4 | 1,332.1 | 1,655.3 | 2,394.0 | 3,286.2 | 4,175.4 |
| 1,300 | 83.2 | 188.8 | 326.9 | 515.2 | 731.3 | 1,154.6 | 1,461.4 | 1,816.0 | 2,626.5 | 3,605.2 | 4,580.7 |
| 1,400 | 90.6 | 205.7 | 356.2 | 561.5 | 797.0 | 1,258.3 | 1,592.7 | 1,979.1 | 2,862.4 | 3,929.1 | 4,992.2 |
| 1,500 | 98.2 | 222.9 | 385.9 | 608.3 | 863.4 | 1,363.1 | 1,725.4 | 2,144.0 | 3,100.9 | 4,256.4 | 5,408.2 |
| 1,600 | 105.8 | 240.1 | 415.8 | 655.3 | 930.2 | 1,468.6 | 1,858.9 | 2,309.9 | 3,340.9 | 4,585.9 | 5,826.8 |
| 1,700 | 113.4 | 257.4 | 445.7 | 702.5 | 997.2 | 1,574.3 | 1,992.7 | 2,476.1 | 3,581.3 | 4,915.8 | 6,246.0 |
| 1,800 | 121.0 | 274.6 | 475.5 | 749.5 | 1,063.8 | 1,679.5 | 2,125.9 | 2,641.7 | 3,820.7 | 5,244.5 | 6,663.6 |
| 1,900 | 128.5 | 291.6 | 505.0 | 796.0 | 1,129.9 | 1,783.8 | 2,257.9 | 2,805.7 | 4,058.0 | 5,570.2 | 7,077.4 |
| 2,000 | 135.9 | 308.4 | 534.1 | 841.9 | 1,195.0 | 1,886.7 | 2,388.1 | 2,967.5 | 4,292.0 | 5,891.3 | 7,485.5 |

Local LCD Display

The 3410 Series Electronics offer an optional local LCD display that utilizes three lines to indicate the variable name, variable value and engineering units. The local display configuration is supported via MeterLink software or the handheld Fisher AMS 475 Field Communicator utilizing the HART interface protocol.

The local display shows up to 10 items which are user selectable from 26 variables. The display can be configured to scale



Figure 2: Local LCD display.

volume units as actual or 000's, with an adjustable time base of seconds, hours or days. The scroll rate can be adjusted from 1 to 100 seconds (default 5 seconds).

Table 5: User Selectable Display Variables

| Variables | Description |
|---------------------------------|--|
| Volumetric Flow Rate | Uncorrected (actual) Corrected (standard or normal) |
| Average Flow Velocity | (no description necessary) |
| Average Speed of Sound | (no description necessary) |
| Pressure | Flowing, if utilized |
| Temperature | Flowing, if utilized |
| Frequency Output | 1A, 1B, 2A or 2B |
| Frequency Output K-factor | Channel 1 or 2 |
| Analog Output | 1 or 2 |
| Current Day's Volume Totals | Uncorrected or Corrected (forward or reverse) |
| Previous Day's Volume Totals | Uncorrected or Corrected (forward or reverse) |
| Total Volume Totals (non-reset) | Uncorrected or Corrected (forward or reverse) |

Input/Output

Table 6: CPU Module I/O Connections (maximum wire gauge is 18 AWG)

| | I/O Connection Type | Qty | Description |
|--|---------------------------------|-----|--|
| Serial Communications | Serial RS232/RS485 Port | 1 | <ul style="list-style-type: none"> ▪ Modbus RTU/ASCII ▪ 115 kbps baud rate ▪ RS232/RS485 Full Duplex ▪ RS485 Half Duplex |
| | Ethernet Port (TCP/IP) 100BaseT | 1 | <ul style="list-style-type: none"> ▪ Modbus TCP |
| Digital Input ⁽¹⁾ | Contact Closure | 1 | <ul style="list-style-type: none"> ▪ Status ▪ Single polarity |
| Analog Inputs ⁽²⁾ | 4-20 mA | 2 | <ul style="list-style-type: none"> ▪ AI-1 Temperature⁽³⁾ ▪ AI-2 Pressure⁽³⁾ |
| Frequency/Digital Outputs | TTL/Open Collector | 5 | <ul style="list-style-type: none"> ▪ User Configurable (can configure Digital Input as 6th Frequency/Digital Output) |
| Analog Output ^(2, 4) | 4-20 mA | 1 | <ul style="list-style-type: none"> ▪ Independently configurable analog output ▪ HART[®] 7 Compliant, consult factory for HART 5 |

Table 7: Optional I/O Expansion Module

| | I/O Connection Type | Qty | Description |
|------------------------------|-------------------------|-----|---|
| Serial Communications | Serial RS232/RS485 Port | 1 | <ul style="list-style-type: none"> ▪ Modbus RTU/ASCII ▪ 115 kbps baud rate ▪ RS232/RS485 Half Duplex |
| | Ethernet Port | 1 | <ul style="list-style-type: none"> ▪ 100BaseT ▪ Three Ports |
| Analog Output | 4-20mA | 1 | <ul style="list-style-type: none"> ▪ Reserved for future use |

Optional I/O Expansion Slot(s) by Enclosure Type: Standard Enclosure: 1 RS232/RS485 Half Duplex, 2-Wire OR 1 I/O Expansion Module Extended (Retrofit) Enclosure: 2 RS232/RS485 Half Duplex, 2-Wire OR 1 I/O Expansion Module and 1 RS232/RS485 Half Duplex, 2-Wire

(1) The analog-to-digital conversion accuracy is within $\pm 0.05\%$ of full scale over the operating temperature range.

(2) A 24 volt DC power supply is available to provide power to the sensors.

(3) AI-1 and AI-2 are electronically isolated and operate in sink mode. The input contains a series resistance for HART[®] Communicators to be connected for sensor configuration.

(4) The analog output zero scale offset error is within $\pm 0.1\%$ of full scale and gain error is within $\pm 0.2\%$ of full scale. The total output drift is within ± 50 ppm of full scale per $^{\circ}\text{C}$.

Diagnostics and Software

Expedite delivery of more in-depth diagnostics by activating the optional Continuous Flow Analysis (CFA)⁽¹⁾ feature in the Model 3414 meter's firmware. CFA helps minimize flow measurement uncertainty by determining the root cause of the diagnostic parameter indication. Using these intelligent gas flow diagnostics, operators can more easily maintain meter health and ensure the highest measurement integrity.

Every Daniel ultrasonic flow meter is provided with advanced MeterLink™ Software to simplify monitoring and troubleshooting. This advanced software displays a number of performance-based diagnostics that indicate meter health. In addition, dynamic flow-based diagnostics help operators identify flow disturbances that may affect measurement uncertainty.

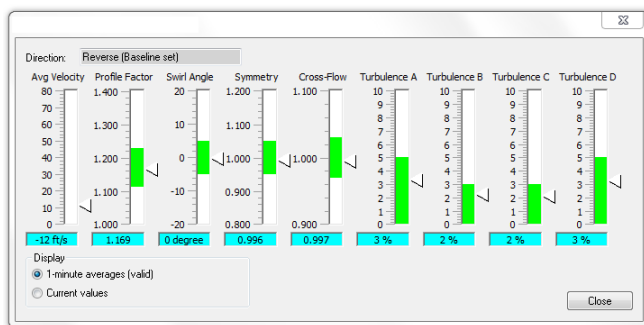


Figure 3A: Daniel MeterLink Baseline Viewer⁽¹⁾

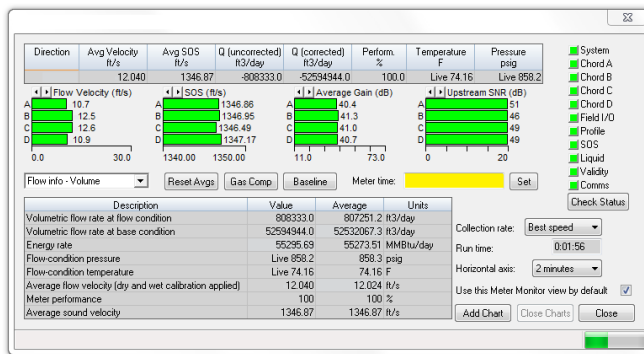


Figure 3B: MeterLink Monitor Screen

- MeterLink software is supplied with meter at no charge
- MeterLink is required for transmitter configuration
 - Meters also configurable with AMS Device Manager or 475 Field Communicator if HART is used
- MeterLink software requires RS232, RS485 full duplex or Ethernet (recommended)
- Supports Microsoft® Vista™, 7, 8.1 and 10
- Microsoft Office 2003-2016

| Table 8: Features of Meter and MeterLink ⁽²⁾ | | | | |
|---|--|---------------------------------------|--|---|
| | | With Continuous Flow Analysis Feature | Without Continuous Flow Analysis Feature | |
| Operation | Monitor Screen | ● | ● | |
| | Chart Diagnostic Data | ● | ● | |
| | Multiple Charts | ● | ● | |
| | Charts with Green Limit Bands | ● | ● | |
| | View Waveforms | ● | ● | |
| | Configurable Modbus GC Component Data Table* | ● | ● | |
| | AGA 8 Part 1 & 2/Meter SOS Comparison | ● | ● | |
| | Transducer Health Monitoring* | ● | ● | |
| | AGA 8 Part 1 & 2 Calculator (offline) | ● | ● | |
| | SNR displayed in dB | ● | ● | |
| History | Improved Help Topics/Links | ● | ● | |
| | Baseline Viewer™ (4-path only) | ● | ● | |
| | Maintenance Logs | ● | ● | |
| | Trend Maintenance Logs | ● | ● | |
| | Merge Event Logs | ● | ● | |
| | Hourly Logs (100 days)* | ● | ● | |
| | Daily Logs (365 days)* | ● | ● | |
| | Hourly/Daily Log Graphing | ● | ● | |
| | Configuration | Field Setup Wizard | ● | ● |
| | | Meter Directory Support | ● | ● |
| Automatic File Naming | | ● | ● | |
| Compare Configurations from Logs | | ● | ● | |
| Analog Input Calibration | | ● | ● | |
| Local Display Configurator | | ● | ● | |
| Modbus GC Component Data Table Configurator | | ● | ● | |
| Flow Calibration Wizard | | ● | ● | |
| Modbus TCP Server Configuration | | ● | ● | |
| Baseline Configuration Wizard | | ● | ● | |
| Alarms | Alarm/Audit/System Logs* | ● | ● | |
| | Display New Latched Alarms | ● | ● | |
| | Severity Alarm Display | ● | ● | |
| | Bore Buildup Alert | ● | ● | |
| | Blockage Alert | ● | ● | |
| | Abnormal Profile Alert | ● | ● | |
| | Liquid Detection Alert | ● | ● | |
| Reverse Flow Alert | ● | ● | | |

* Features highlighted in blue represent functions of the meter.

(1) Requires a Continuous Flow Analysis software key.

(2) MeterLink does not support Mark II Gas Ultrasonic Meters.

Safety and Compliance


The Daniel SeniorSonic 3414 gas ultrasonic flow meter meets worldwide industry standards for electrical and intrinsic safety certifications and approvals. Consult a Daniel technical specialist for a complete list of agencies and certifications.

Safety Classifications

Underwriters Laboratories (UL / cUL)

- Hazardous Locations — Class I, Division 1, Groups C and D

CE Marked to Directives

- Explosive Atmospheres (ATEX)
- Certificate — Demko II ATEX 1006133X
- Marking —  II 2G Ex d ia IIB T4 Gb
(-40°C ≤ T ≤ +60°C)
- Pressure Equipment Directive (PED)
- Electromagnetic Compatibility (EMC)

INMETRO

- Certificate — NCC 11.0163 X
- Marking — Ex d [ia] IIB T4 Gb IP66W

International Electrotechnical Commission (IECEX)

- Marking — Ex d ia IIB T4

Canadian Registration Number

- Certificate — 0F14855

Environmental Ratings

Aluminum

- NEMA 4
- IP66 to EN60529

Stainless Steel

- NEMA 4X
- IP66 to EN60529

Metrology Approval

OIML

- OIML R137-1&2 Edition 2012(E)
- Class 0.5

MID

- Directive 2014/32/EU (MID MI-002)
- Class 1.0

China Pattern Approval (CPA)

Measurement Canada

- Approval — AG-0623



Figure 4A: Standard aluminum electronics enclosure with optional display on SeniorSonic 3414 meter.



Figure 4B: Optional larger, retrofit electronics enclosure on SeniorSonic 3414 meter (no optional display available).

Operation Limits

Consult a Daniel technical specialist if requirements are outside of the operation limits shown below for T-21 / T-41 / T-22 transducers.

| Table 9A: Recommended Maximum Velocity for DN300 and Smaller Line Size Meters (Metric Units) | | |
|--|---|--|
| Nominal Meter Size (DN) | Maximum Velocity Rating at 0 kPag or Greater (m/s) ⁽¹⁾ | Capacity at Maximum Rated Velocity (ACMH) ⁽¹⁾ |
| 100 | 30.5 | 901 |
| 150 | 30.5 | 2,045 |
| 200 | 30.5 | 3,541 |
| 250 | 30.5 | 5,582 |
| 300 | 30.5 | 8,006 |

| Table 9B: Recommended Maximum Velocity for DN400 and Larger Line Size Meters (Metric Units) | | | | |
|---|---|---|--|--|
| Nominal Meter Size (DN) | Maximum Velocity Rating at 345 kPag (m/s) | Capacity between 345 and 689 kPag (ACMH) ⁽²⁾ | Maximum Velocity Rating at 689 kPag or Greater (m/s) | Capacity at Maximum Rated Velocity (ACMH) ⁽²⁾ |
| 400 | 15.2 | 6,465 | 30.5 | 12,930 |
| 450 | 15.2 | 7,917 | 30.5 | 15,835 |
| 500 | 15.2 | 10,301 | 30.5 | 20,603 |
| 600 | 15.2 | 15,027 | 30.5 | 30,055 |
| 750 | 13.7 | 21,406 | 26 | 40,433 |
| 900 | 11.4 | 25,907 | 23 | 51,814 |

| Table 9C: Recommended Maximum Velocity for 12-in and Smaller Line Size Meters (US Customary Units) | | |
|--|--|--|
| Nominal Meter Size (in) | Maximum Velocity Rating at 0 psig or Greater (ft/s) ⁽¹⁾ | Capacity at Maximum Rated Velocity (ACFH) ⁽¹⁾ |
| 4 | 100 | 31,826 |
| 6 | 100 | 72,226 |
| 8 | 100 | 125,068 |
| 10 | 100 | 197,136 |
| 12 | 100 | 282,743 |

| Table 9D: Recommended Maximum Velocity for 16-in and Larger Line Size Meters (US Customary Units) | | | | |
|---|---|---|--|--|
| Nominal Meter Size (in) | Maximum Velocity Rating at 50 psig (ft/s) | Capacity between 50 to 100 psig (ACFH) ⁽²⁾ | Maximum Velocity Rating at 100 psig (ft/s) | Capacity at Max Rated Velocity (ACFH) ⁽²⁾ |
| 16 | 50 | 228,318 | 100 | 456,635 |
| 18 | 50 | 292,131 | 100 | 584,263 |
| 20 | 50 | 363,799 | 100 | 727,598 |
| 24 | 50 | 530,696 | 100 | 1,061,392 |
| 30 | 45 | 755,952 | 85 | 1,427,909 |
| 36 | 37.5 | 914,912 | 75 | 1,829,824 |

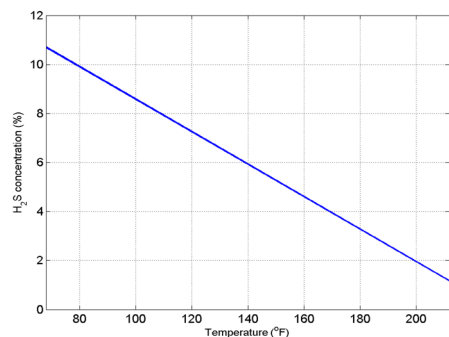
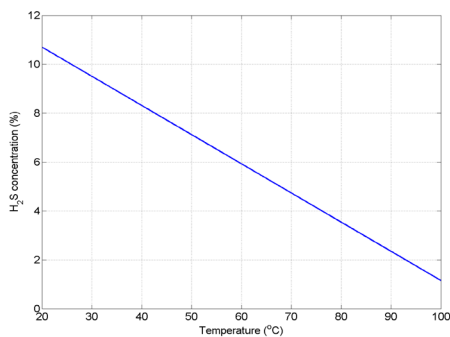


Figure 5: H₂S Limits by Temperature for Daniel T-20 Series Transducers

(1) Isolated transducer mounts required for DN300 (12-in) and smaller line size meters to achieve 0 to 345 kPag (0 to 100 psig).

(2) Capacities are for meter ID equivalent to Schedule 40 (or STD).

Weights and Dimensions

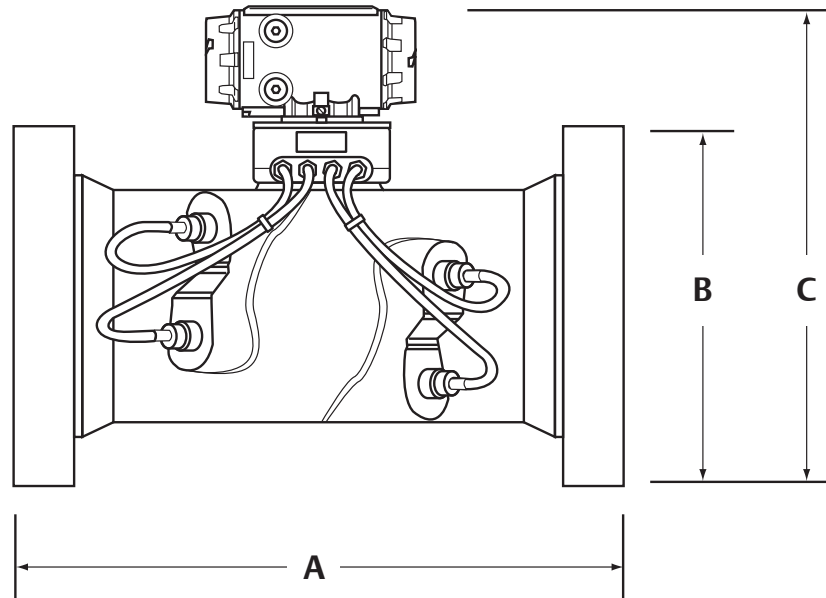


Figure 6A: Meter Dimension Key (See tables 10A and 10B)

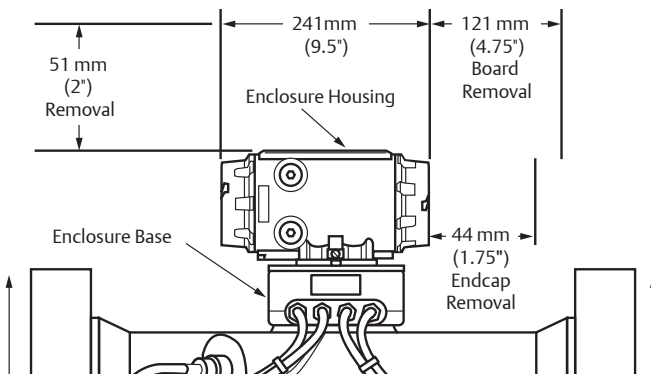


Figure 6B: Position of Enclosure Housing

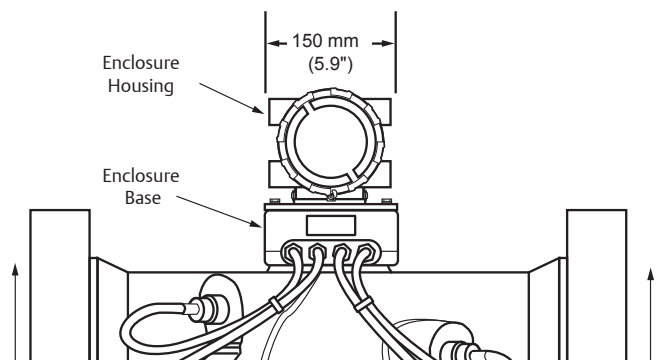


Figure 6C: Optional Position of Enclosure Housing⁽¹⁾

(1) Enclosure housing may be rotated 360 degrees in 90 degree increments.

Weights and Dimensions

The Meter Dimension Key diagram (Figure 6A) on page 10 illustrates the meter component measurements that correspond to A, B and C in the chart below. All weights and dimensions based on standard electronics enclosure and standard carbon steel material. Consult factory for other materials. The certified approval drawing will include the actual weights and dimensions

| Table 10A: Weights and Dimensional Data (Metric Units) | | | | | | | | | | | | | | |
|---|-------------|-------|-------|-------|-------|-------|-----|-------|-------|-------|--------|--------|--------|--------|
| [Line Sizes DN100 to DN150 Port Angle = 45°] [Line Sizes DN200 to DN900 Port Angle = 60°] | | | | | | | | | | | | | | |
| Nominal Line Size (DN) | | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 600 | 650 | 750 | 900 |
| PN 50 | Weight (kg) | 178 | 196 | 200 | 273 | 341 | CF | 589 | 848 | 919 | 1425 | 1485 | 1916 | 2414 |
| | A (mm) | 736.6 | 749.3 | 546.1 | 622.3 | 660.4 | CF | 762 | 800.1 | 901.7 | 990.6 | 1029 | 1137 | 1302 |
| | B (mm) | 254 | 318 | 381 | 444.5 | 520.7 | CF | 647.7 | 711.2 | 774.7 | 914.4 | 973 | 1092 | 1270 |
| | C (mm) | 472 | 526 | 582.7 | 645 | 709 | CF | 814.3 | 869 | 930 | 1057 | 1141 | 1255 | 1405 |
| PN 100 | Weight (kg) | 185 | 196 | 237 | 351 | 419 | CF | 782 | 925 | 1190 | 1802 | 2006 | 2483 | 3753 |
| | A (mm) | 737 | 749 | 546 | 622 | 660 | CF | 762 | 800 | 902 | 991 | 1194 | 1227 | 1397 |
| | B (mm) | 273 | 356 | 419 | 508 | 559 | CF | 686 | 743 | 812.8 | 939.8 | 1016 | 1130 | 1314.5 |
| | C (mm) | 481.3 | 544.6 | 601.7 | 677.9 | 727.2 | CF | 833.4 | 884.5 | 947.7 | 1068.6 | 1157.5 | 1275 | 1428 |
| PN 150 | Weight (kg) | 193 | 278 | 460 | 903 | 1212 | CF | 1507 | 1440 | 1666 | 3460 | CF | 3743 | 5433 |
| | A (mm) | 787.4 | 940 | 698.5 | 774.7 | 876.3 | CF | 1054 | 914.4 | 939.8 | 1498.6 | CF | 1473.2 | 1543.1 |
| | B (mm) | 292.1 | 381 | 469.9 | 546.1 | 609.6 | CF | 705 | 787.4 | 857.3 | 1041.4 | CF | 1231.9 | 1460.5 |
| | C (mm) | 490 | 566 | 640 | 703.3 | 773.2 | CF | 866 | 922.3 | 1002 | 1150.9 | CF | 1332 | 1524 |
| PN 250 | Weight (kg) | 202 | 310 | 478 | 1072 | 1485 | CF | 2388 | CF | 3639 | 4705 | CF | CF | CF |
| | A (mm) | 787 | 940 | 699 | 775 | 876 | CF | 1054 | CF | 1524 | 1727 | CF | CF | CF |
| | B (mm) | 292 | 381 | 470 | 546 | 610 | CF | 706 | CF | 984.3 | 1168 | CF | CF | CF |
| | C (mm) | 500 | 569 | 645 | 721 | 805 | CF | 925 | CF | 1066 | 1213 | CF | CF | CF |

| Table 10B: Weights and Dimensional Data (US Customary Units) | | | | | | | | | | | | | | |
|--|-------------|------|------|------|------|------|----|------|------|------|-------|------|------|-------|
| [Line Sizes 4 to 6 in Port Angle = 45°] [Line Sizes 8 to 36 in Port] | | | | | | | | | | | | | | |
| Nominal Line Size (in) | | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 24 | 26 | 30 | 36 |
| 300 ANSI | Weight (lb) | 393 | 433 | 441 | 601 | 751 | CF | 1299 | 1870 | 2027 | 3141 | 3273 | 4223 | 5323 |
| | A (in) | 29 | 29.5 | 21.5 | 24.5 | 26 | CF | 30 | 31.5 | 35.5 | 39 | 40.5 | 44.8 | 51.3 |
| | B (in) | 10 | 12.5 | 15 | 17.5 | 20.5 | CF | 25.5 | 28 | 30.5 | 36 | 38.3 | 43 | 50 |
| | C (in) | 18.6 | 20.7 | 22.9 | 25.4 | 27.9 | CF | 32.1 | 34.2 | 36.6 | 41.6 | 44.9 | 49.4 | 55.3 |
| 600 ANSI | Weight (lb) | 408 | 433 | 523 | 773 | 923 | CF | 1723 | 2040 | 2623 | 3973 | 4423 | 5473 | 8273 |
| | A (in) | 29 | 29.5 | 21.5 | 24.5 | 26 | CF | 30 | 31.5 | 35.5 | 39 | 47 | 48.3 | 55 |
| | B (in) | 10.8 | 14 | 16.5 | 20 | 22 | CF | 27 | 29.3 | 32 | 37 | 40 | 44.5 | 51.8 |
| | C (in) | 19 | 21.4 | 23.7 | 26.7 | 28.6 | CF | 32.8 | 34.8 | 37.3 | 42.1 | 45.6 | 50.2 | 56.2 |
| 900 ANSI | Weight (lb) | 426 | 613 | 1013 | 1991 | 2673 | CF | 3323 | 3174 | 3673 | 7629 | CF | 8251 | 11978 |
| | A (in) | 31 | 37 | 27.5 | 30.5 | 34.5 | CF | 41.5 | 36 | 37 | 59 | CF | 58 | 60.8 |
| | B (in) | 11.5 | 15 | 18.5 | 21.5 | 24 | CF | 27.8 | 31 | 33.8 | 41 | CF | 48.5 | 57.5 |
| | C (in) | 19.3 | 22.3 | 25.2 | 27.7 | 30.4 | CF | 34.1 | 36.3 | 39.5 | 45.3 | CF | 52.4 | 60 |
| 1500 ANSI | Weight (lb) | 446 | 683 | 1053 | 2363 | 3273 | CF | 5265 | CF | 8023 | 10373 | CF | CF | CF |
| | A (in) | 31 | 37 | 27.5 | 30.5 | 34.5 | CF | 41.5 | CF | 60 | 68 | CF | CF | CF |
| | B (in) | 12.3 | 15.5 | 19 | 23 | 26.5 | CF | 32.5 | CF | 38.8 | 46 | CF | CF | CF |
| | C (in) | 19.7 | 22.4 | 25.4 | 28.4 | 31.7 | CF | 36.4 | CF | 42 | 47.8 | CF | CF | CF |

CF: Consult factory

Recommended Installation

Recommended Pipe Lengths

The drawings below represent recommended minimum pipe lengths for the installation of the Daniel SeniorSonic 3414 Gas Ultrasonic Flow Meter. Please consult a Daniel technical specialist for installation recommendations for the specific application. Other lengths or flow conditioners can be accommodated.

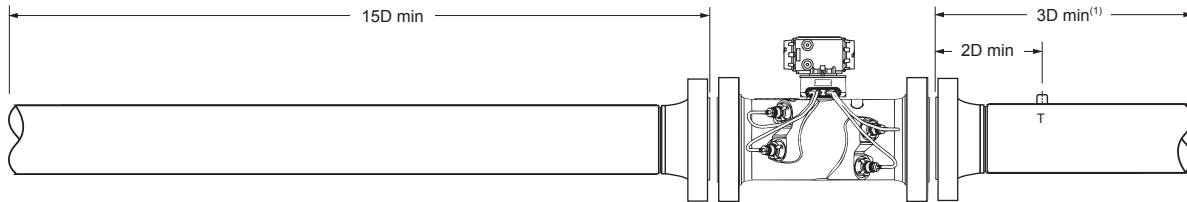
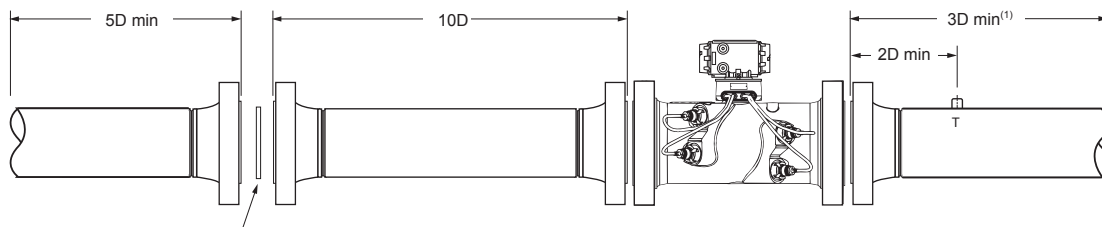
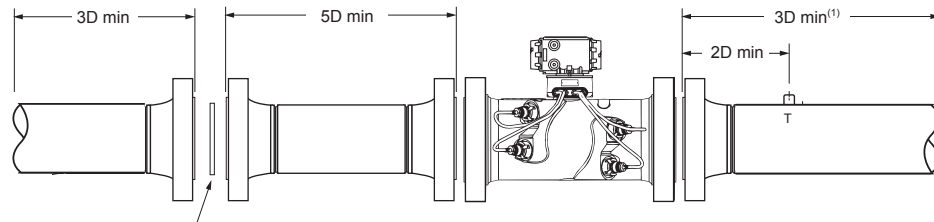


Figure 7A: Piping Recommendation for Gas Ultrasonic Meter (No Flow Conditioner)



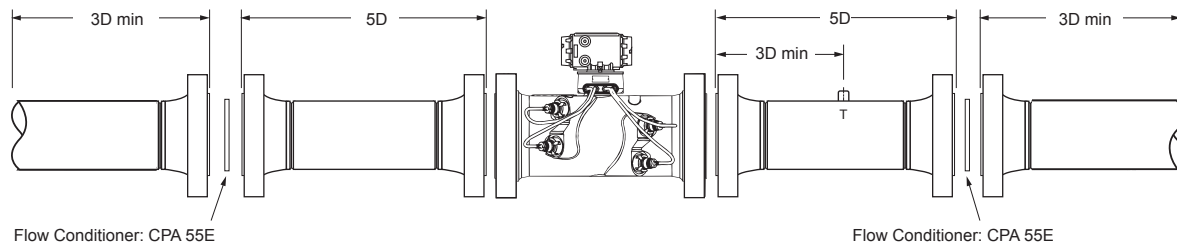
Flow Conditioner: Daniel Profiler, CPA 50E or CPA 55E

Figure 7B: Piping Recommendation for Gas Ultrasonic Meter with a Flow Conditioner



Flow Conditioner: CPA 55E

Figure 7C: Piping Recommendation for Gas Ultrasonic Meter with a Flow Conditioner (Compact Installation)⁽²⁾



Flow Conditioner: CPA 55E

Flow Conditioner: CPA 55E

Figure 7D: Piping Recommendation for Bi-directional Gas Ultrasonic Meter with Flow Conditioners (Compact Installation)⁽²⁾

Notes:

1. For best results, flow conditioning is recommended
2. D = Nominal pipe size in inches (i.e., 6-in pipe size; 10D = 60-in)
3. T = Temperature measurement location
4. Pressure measurement location provided on meter body

(1) Additional pipe length may be required for additional taps (i.e. sample probe, test well, etc.).













(2) Longer upstream lengths can increase long term baseline diagnostics stability. This configuration not applicable to OIML installations.



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|  | <p>Liquid Analysis</p> |  | <p>Flame and Gas Detection</p> |
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