Ultra high purity transducer
For explosion-protected areas, Ex nA ic
Models WUC-10, WUC-15 and WUC-16

Applications
- Semiconductor, flat panel display and photovoltaic industry
- Ultrapure media and special gas systems (gas sticks, gas panels, bulk-gas supply, tank farm installations)

Special features
- Compact design
- ATEX and IECEx zone 2 approval
  FM class I div. 2 groups A, B, C & D
- Ingress protection IP67 (NEMA 4) with “side access” zero potentiometer
- Excellent EMC stability
- Active temperature compensation

Description
Compact
The space-saving design of the model WUC-1x provides greater free space in plants and installations.

The WUC-15 and 16 series transducers are notable for their excellent self-draining characteristics. The special sensor connection design eliminates the influence on the sensor signal through loads on the process connections or weld seams.

Versatile
The high IP67 ingress protection also enables them to be used under harsh conditions on tank farm and speciality gas installations outdoors.

This series of instruments was also developed for use in Ex zone 2. The T6 temperature class classification ensures that even measurements of media with low self-ignition temperatures, such as PH3 (phosphine), do not present a problem.

Reliable
With cyclic pressure rinsing, high gas throttling values (Joule-Thompson effect) and external operation, high temperature fluctuations can occur. The active temperature compensation detects these changes and minimises their influence. Thus stable measurement is ensured.

Through the sealed “side access” zero point adjustment, the high IP67 ingress protection is permanently maintained. Simple handling and protection from unintentional adjustment is ensured.

For all wetted parts the materials 316L VIM VAR and special thin-film sensors from 2.4711 / UNS R30003 are used. Prior to final assembly all wetted parts are electropolished and cleaned using state-of-the-art processes.

Through an individual examination of each transducer it is ensured that the required values for leak tightness, overpressure stability, accuracy and particles are met in accordance with the applicable SEMI™ standards.

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### Specifications

#### Model WUC-10, WUC-15

<table>
<thead>
<tr>
<th></th>
<th>Model WUC-10, WUC-15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring range (psi)</td>
<td>30 60 100 160 250 350 500 1,000 1,500 2,000 3,000 5,000</td>
</tr>
<tr>
<td>Measuring range (bar)</td>
<td>2 4 7 11 17 25 36 70 100 145 225 360</td>
</tr>
<tr>
<td>Overload safety (psi)</td>
<td>120 120 210 320 500 750 1,100 2,100 3,000 4,200 6,600 10,000</td>
</tr>
<tr>
<td>Burst pressure (psi)</td>
<td>1,800 1,800 2,200 2,600 4,800 6,200 7,400 8,000 10,500 10,500 10,500 10,500</td>
</tr>
</tbody>
</table>

Further measuring ranges on request.

#### Measuring principle
Thin-film sensor

#### Materials

- **Wetted parts**: Process connection: 316L VIM/VAR
  Thin-film sensor: 2.4711 / UNS R30003
- **Case**: 304 SS
- **Particle test**: ≤ 0.1 µm particles 0.1 ptc / ft³ per SEMI E49.8
- **Helium leak test**: < $1 \times 10^{-9}$ mbar l/sec (atm STD cc/sec) per SEMI F1
- **Surface treatment**: Electropolished, typical Ra ≤ 0.13 µm (RA 5); max. Ra ≤ 0.18 µm (RA 7) per SEMI F19
- **Dead volume**: WUC-10 < 1.5 cm³, WUC-15 < 1 cm³, WUC-16 < 1 cm³

#### Permissible media
Speciality gases, vapours, liquids

#### Power supply $U_+$
DC 10 ... 30 V with output signal DC 0 ... 5 V / 4 ... 20 mA
DC 14 ... 30 V with output signal DC 0 ... 10 V

#### Output signal and permissible max. load $R_A$ in Ω

- 4 ... 20 mA, 2-wire, $R_A \leq (U_+ - 10 V) / 0.02 A$
- DC 0 ... 5 V, 3-wire, $R_A > 5 kΩ$
- DC 0 ... 10 V, 3-wire, $R_A > 10 kΩ$

#### Power $P_{max}$
1 W

#### Adjustability of zero point
-5 ... +3.5 % of span (via potentiometer) current output signal
-2 ... +5 % of span (via potentiometer) voltage output signal

#### Response time (10 ... 90 %)
≤ 300 ms

#### Insulation voltage
DC 500 V

#### Accuracy
- ≤ 0.2 % of span (≤ 0.4 % of span for measuring ranges ≤ 2 bar) RSS (root sum squares)
- ≤ 0.5 % of span
  1) (≤ 1.0 % of span 1) for measuring ranges ≤ 2 bar) per IEC 61298-2

#### Non-linearity
- ≤ 0.1 % of span (≤ 0.15 % of span for measuring ranges ≤ 2 bar) (BFSL) per IEC 61298-2

#### Hysteresis
≤ 0.14 % of span

#### Non-repeatability
≤ 0.12 % of span

#### Stability per year
≤ 0.25 % of span (typ.) at reference conditions (≤ 0.4 % of span with measuring ranges ≤ 2 bar)

#### Permissible temperature ranges

<table>
<thead>
<tr>
<th></th>
<th>non-Ex</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Medium</strong></td>
<td>-20 ... +100 °C</td>
<td>-20 ... +85 °C</td>
<td>-20 ... +60 °C</td>
<td>-20 ... +40 °C</td>
</tr>
<tr>
<td></td>
<td>-4 ... +212 °F</td>
<td>-4 ... +185 °F</td>
<td>-4 ... +140 °F</td>
<td>-4 ... +104 °F</td>
</tr>
<tr>
<td><strong>Ambient</strong></td>
<td>-20 ... +85 °C</td>
<td>-20 ... +85 °C</td>
<td>-20 ... +60 °C</td>
<td>-20 ... +40 °C</td>
</tr>
<tr>
<td></td>
<td>-4 ... +185 °F</td>
<td>-4 ... +185 °F</td>
<td>-4 ... +140 °F</td>
<td>-4 ... +104 °F</td>
</tr>
<tr>
<td><strong>Storage</strong></td>
<td>-40 ... +100 °C</td>
<td>-40 ... +100 °C</td>
<td>-40 ... +100 °C</td>
<td>-40 ... +100 °C</td>
</tr>
<tr>
<td></td>
<td>-40 ... +212 °F</td>
<td>-40 ... +212 °F</td>
<td>-40 ... +212 °F</td>
<td>-40 ... +212 °F</td>
</tr>
</tbody>
</table>

#### Rated temperature range
-20 ... +80 °C, -4 ... +176 °F (actively compensated)

#### Temperature coefficients within the rated temperature range (actively compensated)

<table>
<thead>
<tr>
<th></th>
<th>≤ 0.1 % of span/10 K</th>
<th>≤ 0.15 % of span/10 K</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean TC of zero</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mean TC of span</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Production environment
Clean room class 5 per ISO 14644

#### Packaging
Double packaging per SEMI E49.6

#### Shock resistance
500 g (1.5 ms) per IEC 60068-2-27

#### Vibration resistance
0.35 mm (10 ... 58 Hz) / 5 g (58.1 ... 2,000 Hz) per EN 60068-2-6

#### Short-circuit resistance
$S_v$ vs. $U_-$ (short time)

#### Reverse polarity protection
$U_+$ vs. $U_-$

#### Weight
approx. 0.1 kg

---

1) Including non-linearity, hysteresis, zero offset and end value deviation (corresponds to measured error per IEC 61298-2).
## Electrical connections

### Bayonet connector (4-pin)

<table>
<thead>
<tr>
<th>Wire</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>U+</td>
<td>A</td>
</tr>
<tr>
<td>U-</td>
<td>D</td>
</tr>
<tr>
<td>U+</td>
<td>1</td>
</tr>
<tr>
<td>U-</td>
<td>3</td>
</tr>
<tr>
<td>U+</td>
<td>4</td>
</tr>
<tr>
<td>U-</td>
<td>8</td>
</tr>
<tr>
<td>S+</td>
<td>9</td>
</tr>
</tbody>
</table>

### Circular connector M12 x 1 (4-pin)

<table>
<thead>
<tr>
<th>Wire</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>U+</td>
<td>1</td>
</tr>
<tr>
<td>U-</td>
<td>3</td>
</tr>
<tr>
<td>U+</td>
<td>red</td>
</tr>
<tr>
<td>U-</td>
<td>black</td>
</tr>
</tbody>
</table>

### Cable outlet 1.5 m and 3 m

<table>
<thead>
<tr>
<th>Wire</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>U+</td>
<td>1</td>
</tr>
<tr>
<td>U-</td>
<td>3</td>
</tr>
<tr>
<td>U+</td>
<td>red</td>
</tr>
<tr>
<td>U-</td>
<td>black</td>
</tr>
<tr>
<td>S+</td>
<td>brown</td>
</tr>
</tbody>
</table>

### Cable diameter

- 0.22 mm² (AWG 24)
- 4.8 mm

### Conductor cross-section

- -
- -

### Ingress protection per IEC 60529

- IP67 (NEMA 4)
- IP54

Ingress protection only applies when plugged in using mating connectors that have the appropriate ingress protection.

## Electrical connections

### Sub-D connector, 9-pin

<table>
<thead>
<tr>
<th>Wire</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>U+</td>
<td>4</td>
</tr>
<tr>
<td>U-</td>
<td>8</td>
</tr>
<tr>
<td>U+</td>
<td>7</td>
</tr>
<tr>
<td>U-</td>
<td>5</td>
</tr>
<tr>
<td>U+</td>
<td>9</td>
</tr>
<tr>
<td>U-</td>
<td>12</td>
</tr>
</tbody>
</table>

### Sub-D HD connector (15-pin)

<table>
<thead>
<tr>
<th>Wire</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>U+</td>
<td>4</td>
</tr>
<tr>
<td>U-</td>
<td>8</td>
</tr>
<tr>
<td>S+</td>
<td>1</td>
</tr>
<tr>
<td>U+</td>
<td>7</td>
</tr>
<tr>
<td>U-</td>
<td>5</td>
</tr>
<tr>
<td>U+</td>
<td>9</td>
</tr>
<tr>
<td>U-</td>
<td>12</td>
</tr>
<tr>
<td>S+</td>
<td>2</td>
</tr>
</tbody>
</table>

### Ingress protection per IEC 60529

- IP54
- IP54

Ingress protection only applies when plugged in using mating connectors that have the appropriate ingress protection.
Dimensions in inch [mm] WUC-10

Electrical connections

Bayonet circular connector

1/4” union nut, rotatable

Process connections

1/4” weld stub
1/4” male nut, rotatable
1/4” T-connector, weld stub

Max. available pressure: 300 psi

Zero point adjustment
Dimensions in inch [mm] WUC-15

Electrical connections

Bayonet circular connector

1/4" male nut, fixed
1/4" male nut, fixed

Zero point adjustment

Process connections

1/4" union nut (female), rotatable
1/4" union nut (female), rotatable

1/4" male nut, rotatable
1/4" male nut, rotatable

1/4" male nut, fixed, high flow through
1/4" male nut, fixed, high flow through
only available with measuring ranges up to 25 bar / 300 psi

1/4" union nut (female), rotatable
1/4" male nut, rotatable
Process connections for WUC-15

1/4" male nut, fixed
1/4" union nut (female), rotatable

1/4" male nut, fixed
1/4" male nut, rotatable

1/4" male nut, fixed
1/4" weld stub

1/4" weld stub
1/4" weld stub
Dimensions in inch [mm] WUC-16

Electrical connections

Bayonet circular connector

 MSM W 1 1/2”

Zero point adjustment

Process connections

 MSM C 1 1/2”

Zero point adjustment

 MSM C 1 1/8”

Zero point adjustment
## Approvals

<table>
<thead>
<tr>
<th>Logo</th>
<th>Description</th>
<th>Country</th>
</tr>
</thead>
</table>
| ![CE] | **EU declaration of conformity**  
  - EMC directive  
  - EN 61326 emission (group 1, class B) and interference immunity (industrial application)  
  - Pressure equipment directive  
  - RoHS directive  
  - ATEX directive (option)  
  - Hazardous areas  
    - Ex n Zone 2 gas  
    - [II 3G Ex nA ic IIC T4/T5/T6 Gc X] | European Union |
| ![IECEx] | **IECEx (option)**  
  - Hazardous areas  
    - Ex n Zone 2 gas  
    - [Ex nA ic IIC T4/T5/T6 Gc] | International |
| ![FM] | **FM (option)**  
  - Hazardous areas  
  - Nonincendive Apparatus for use in Class I, Division 2, Groups A, B, C, D  
  - Nonincendive for use in Class I, Zone 2, Group IIC (classified) locations | USA |

### Ordering information

Model / Measuring range / Process connection / Output signal / Power supply / Electrical connection / Cable length / Approval

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