Ultra high purity transducer
With integrated display and optional switch contacts
Models WUD-20, WUD-25 and WUD-26

Applications
- Semiconductor, flat panel display and photovoltaic industry
- Ultrapure gas supply in semiconductor production systems

Description

Reliable
The WUD-2x series ultra high purity transducers combine state-of-the-art transducer concepts with analogue output signals. Thus the safest and most accurate pressure measurements necessary for today’s market requirements are provided.

Pressure measurement, based on a true vacuum reference, and electronic measures for interference shielding and signal noise cancellation ensure high-accuracy pressure measurement and excellent long-term stability.

Active temperature compensation reduces the impact of changing temperatures on the transducer, allowing safe operations even in applications with high fluctuations in temperature, e.g. Joule-Thomson effect in the case of gas expansion.

WUD-25 (flow through) and WUD-26 (surface mount) transducers are specifically designed to sustain torsion-applied stresses often incurred during installation. The special design of the thin-film sensor eliminates the risk of sensor failure due to loads at the process connection or welded joints.

Versatile
The WUD-2x can be readily installed in “on-tool” gas distribution systems. The bright LED display is rotatable and easy to read from any position.

Application-specific monitoring and control operations can be realised via two programmable switch outputs.

Compact
With its small footprint the WUD-2x is the most compact UHP transducer in the market. Thus it is optimally suited for installation in applications with limited mounting space, and even in existing plants it can be easily retrofitted.

Fig. left: WUD-20, single end
Fig. centre: WUD-25, flow through
Fig. right: WUD-26, modular surface mount

Special features
- High-accuracy pressure measurement 0.15 % RSS
- Excellent long-term stability
- Signal noise cancellation and shielding
- Vacuum-referenced pressure measurement
- Active temperature compensation
### Specifications

<table>
<thead>
<tr>
<th>Measuring range</th>
<th>WUD-20, WUD-25, WUD-26</th>
<th>WUD-20, WUD-25</th>
</tr>
</thead>
<tbody>
<tr>
<td>psi</td>
<td>30  60  100  160  250</td>
<td>350  500  1,000</td>
</tr>
<tr>
<td>bar</td>
<td>2   4   7   11   17</td>
<td>25   36   70</td>
</tr>
<tr>
<td>Overload safety</td>
<td>psi 120 120 210 320 500</td>
<td>750 1,100 2,100</td>
</tr>
<tr>
<td>Burst pressure</td>
<td>psi 1,800 1,800 2,200 2,600 4,800</td>
<td>6,200 7,400 8,000</td>
</tr>
</tbody>
</table>

Other measuring ranges and units (e.g. MPa, kg/cm²) on request

| Absolute pressure: 0 ... 2 bar to 0 ... 60 bar
| Vacuum pressure: -1 ... 1 bar to -1 ... 250 bar

**Measuring principle**

- Metal thin-film sensor

**Materials**

- Wetted: Process connection: 316L stainless steel, according to SEMI F20 (option: 316L VIM/VAR)
- Sensor: 2.4711 / UNS R30003
- Case: Lower body: 304 SS
- Plastic components: PC/PBT
- Keyboard: TPE
- Display window: PC

**Inboard helium leak test**

- $< 1 \times 10^{-9}$ mbar l/sec (atm STD cc/sec) per SEMI F1

**Surface finish**

- Electropolished, typical Ra ≤ 0.13 µm (RA 5); max. Ra ≤ 0.18 µm (RA 7), per SEMI F19

**Dead volume**

- WUD-20 < 1.5 cm³
- WUD-25 < 1 cm³
- WUD-26 < 1 cm³

**Permissible medium**

- Special gas, vapour, liquid

**Power supply U⁺**

- DC 10 ... 30 V (with output signal 4 ... 20 mA and DC 0 ... 5 V)
- DC 14 ... 30 V (with output signal DC 0 ... 10 V)

**Output signal and maximum load**

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

**Power $P_{max}$**

- 1 W

**Current consumption**

- max. 50 mA

**Total current consumption**

- max. 250 mA (including switching current)

**Adjustability of zero point**

- -3.5 ... +3.5 % of span (via potentiometer) current output signal
- -2.0 ... +3.5 % of span (via potentiometer) current output signal

**Signal response**

- $10 \ldots 90 \%$ ≤ 300 ms

**Switch points**

- Individually adjustable via external control keys

**Type**

- Transistor switching output NPN

**Quantity**

- 1 or 2

**Function**

- Normally open, normally closed, on, off

**Switching current**

- SP1 / SP2: 100 mA

**Accuracy**

- ≤ 0.5 % of span

**Display**

- Version: 7-segment LED, red, 4-digit, height 8 mm, 270° rotatable
- Accuracy: ≤ 1.0 % of span ± 1 digit
- Update: 0.2 s / 0.5 s / 1 s / 5 s / 10 s / 60 s (adjustable)
- Accuracy: ≤ 0.15 % of span (≤ 0.4 with measuring ranges ≤ 2 bar) RSS (root sum squares)
- ≤ 0.3 % (≤ 0.6 %) with measuring ranges ≤ 2 bar
- Non-linearity: ≤ 0.1 % of span (≤ 0.15 with 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 (typical) at reference conditions (≤ 0.4 with measuring ranges ≤ 2 bar)

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

<table>
<thead>
<tr>
<th>Permissible temperature</th>
<th>-20 ... +100 °C [-4 ... +212 °F]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium</td>
<td>-20 ... +100 °C [-4 ... +212 °F]</td>
</tr>
<tr>
<td>Ambient</td>
<td>-10 ... +60 °C [14 ... +140 °F]</td>
</tr>
<tr>
<td>Storage</td>
<td>-10 ... +60 °C [14 ... +140 °F]</td>
</tr>
<tr>
<td>Rated temperature range (medium)</td>
<td>-20 ... +80 °C [-4 ... +176 °F]  (actively compensated)</td>
</tr>
</tbody>
</table>

| Temperature coefficients in rated temperature range (actively compensated) |
|---------------------------------|---------------------------------|
| Mean TC of zero                 | ≤ 0.10 % of span/10 K           |
| Mean TC of span                 | ≤ 0.15 % of span/10 K           |
| Assembly and packaging area      | Cleanroom class 5 per ISO 14644 |
| Packaging                        | Double bagging per SEMI E49.6   |
| Shock resistance                 | 15 g (11 ms), 30 g (6 ms) per IEC 60068-2-27 |
| Vibration resistance             | 7.5 mm or 2 g (1 ... 200 Hz) / 5 g (200 ... 500 Hz) per IEC 60068-2-6 |
| Electrical safety                |                                 |
| Short-circuit resistance         | S+ vs. U-                       |
| Reverse polarity protection      | U+ vs. U-                       |
| Weight                           | approx. 0.2 kg                  |

### Output signal and permissible load

#### Current output (3-wire)

4 ... 20 mA: \( R_A \leq (U_+ - 10 \text{ V}) / 0.02 \text{ A} \)

#### Voltage output (3-wire)

- DC 0 ... 5 V: \( R_A > 5 \text{ kΩ} \)
- DC 0 ... 10 V: \( R_A > 10 \text{ kΩ} \)

with \( R_A \) in Ohm and \( U_+ \) in Volt
### Electrical connections

<table>
<thead>
<tr>
<th>Bayonet connector 4-pin</th>
<th>Circular connector M12 x 1 4-pin</th>
<th>Circular connector M12 x 1 5-pin</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-wire</td>
<td>U+ = A   U- = D   S+ = B</td>
<td>U+ = 1   U- = 3   S+ = 4</td>
</tr>
<tr>
<td>Switching outputs</td>
<td>-</td>
<td>SP1 = 2</td>
</tr>
<tr>
<td>Wire cross-section</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Cable diameter</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ingress protection per IEC 60529</td>
<td>IP67</td>
<td>IP67</td>
</tr>
</tbody>
</table>

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

### Electrical connections

<table>
<thead>
<tr>
<th>Flying leads 1.5 m or 3 m</th>
<th>Sub-D HD connector 15-pin</th>
<th>Sub-D connector 9-pin</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-wire</td>
<td>U+ = red U- = black S+ = brown</td>
<td>U+ = 7 U- = 5 S+ = 2</td>
</tr>
<tr>
<td>Switching outputs</td>
<td>SP1 = blue, SP2 = white</td>
<td>SP1 = 14, SP2 = 13</td>
</tr>
<tr>
<td>Wire cross-section</td>
<td>0.15 mm²</td>
<td>-</td>
</tr>
<tr>
<td>Cable diameter</td>
<td>4.6 mm ± 0.2 mm</td>
<td>-</td>
</tr>
<tr>
<td>Ingress protection per IEC 60529</td>
<td>IP65</td>
<td>IP20</td>
</tr>
</tbody>
</table>

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**Dimensions in inch [mm] WUD-20**

**Process connections**

1/4" weld stub 1)

1/4" pressure screw, rotatable

1/4" T-connector, weld stub

1) Maximum permissible pressure range of 300 psi for single-end units only
Dimensions in inch [mm] WUD-25

Flying leads

1/4" pressure screw, fixed
1/4" pressure screw, fixed

1/4" union nut, fixed
1/4" pressure screw, fixed
1/4" pressure screw, fixed
1/4" pressure screw, rotatable
1/4" pressure screw, rotatable
1/4" pressure screw, rotatable
1/4" pressure screw, fixed, high flow through
1/4" weld stub
Only available with measuring ranges ≤ 25 bar / 300 psi

Process connections

1/4" union nut, rotatable
1/4" union nut, rotatable

1/4" pressure screw, rotatable
1/4" pressure screw, rotatable
Dimensions in inch [mm] WUD-26

Sub-D connector

Process connections

MSM C 1 1/2"

MSM C 1 1/8"
### Approvals

<table>
<thead>
<tr>
<th>Logo</th>
<th>Description</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="https://example.com" alt="CE" /></td>
<td>EU declaration of conformity</td>
<td>European Union</td>
</tr>
<tr>
<td><img src="https://example.com" alt="FM" /></td>
<td>Hazardous areas</td>
<td>USA</td>
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<tr>
<td><img src="https://example.com" alt="EMC" /></td>
<td>EMC directive</td>
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<tr>
<td><img src="https://example.com" alt="Pressure" /></td>
<td>Pressure equipment directive</td>
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<tr>
<td><img src="https://example.com" alt="RoHS" /></td>
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</tr>
<tr>
<td><img src="https://example.com" alt="EN 61326" /></td>
<td>EN 61326 emission (group 1, class B)</td>
<td></td>
</tr>
<tr>
<td><img src="https://example.com" alt="Interference" /></td>
<td>Interference immunity (industrial application)</td>
<td></td>
</tr>
</tbody>
</table>

Approvals and certificates, see website