

Ultra high purity transducer

For applications in hazardous areas, Ex nA ic

Models WUC-10, WUC-15 and WUC-16

WIKA data sheet PE 87.06



Applications

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

Special features

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



Fig. left: WUC-10, single end

Fig. centre: WUC-15, flow through

Fig. right: WUC-16, modular surface mount

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 plant and speciality gas installations outdoors.

The instrument series has also been 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-Thomson 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.

The wetted parts consist of SEMI F20-compliant 316L stainless steel and a special 2.4711 / UNS R30003 thin-film sensor. 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.

Specifications

| Accuracy specifications | | |
|---|---|-----------------|
| Non-linearity per BFSL per IEC 61298-2 | | |
| For measuring ranges > 2 bar | ≤ 0.1 % of span | |
| For measuring ranges ≤ 2 bar | ≤ 0.15 % of span | |
| Accuracy | → See "Max. measuring deviation" | |
| Max. measuring deviation | | |
| RSS (root sum squares) | For measuring ranges ≤ 2 bar | ≤ 0.4 % of span |
| | For measuring ranges > 2 bar | ≤ 0.2 % of span |
| Per IEC 61298-2 | For measuring ranges ≤ 2 bar | ≤ 1 % of span |
| | For measuring ranges > 2 bar | ≤ 0.5 % of span |
| Zero point setting | | |
| Current output | -5 ... +3.5 % of span (via potentiometer) | |
| Voltage output | -2 ... +5 % of span (via potentiometer) | |
| Non-repeatability per IEC 61298-2 | ≤ 0.12 % of span | |
| Mean temperature coefficient at -20 ... +80 °C [-4 ... +176 °F] (actively compensated) | | |
| Zero point | ≤ 0.1 % of span/10 K | |
| Span | ≤ 0.15 % of span/10 K | |
| Long-term drift per IEC 61298-2 | | |
| For measuring ranges ≤ 2 bar | ≤ 0.4 % of span | |
| For measuring ranges > 2 bar | ≤ 0.25 % of span, at reference conditions | |
| Reference conditions | Per IEC 61298-1 | |

Measuring ranges, gauge pressure, models WUC-10 and WUC-15

| bar | |
|----------|-----------|
| 0 ... 2 | 0 ... 36 |
| 0 ... 4 | 0 ... 70 |
| 0 ... 7 | 0 ... 100 |
| 0 ... 11 | 0 ... 145 |
| 0 ... 17 | 0 ... 225 |
| 0 ... 25 | 0 ... 360 |

| psi | |
|-----------|-------------|
| 0 ... 30 | 0 ... 500 |
| 0 ... 60 | 0 ... 1,000 |
| 0 ... 100 | 0 ... 1,500 |
| 0 ... 160 | 0 ... 2,000 |
| 0 ... 250 | 0 ... 3,000 |
| 0 ... 350 | 0 ... 5,000 |

Measuring ranges, gauge pressure, model WUC-16

| bar | |
|---------|----------|
| 0 ... 2 | 0 ... 11 |
| 0 ... 4 | 0 ... 17 |
| 0 ... 7 | |

| psi | |
|-----------|-----------|
| 0 ... 30 | 0 ... 160 |
| 0 ... 60 | 0 ... 250 |
| 0 ... 100 | |

Other measuring ranges on request.

Further details on: Measuring range

| | |
|---------------------------|---|
| Overpressure limit | ■ 2-fold ■ 4-fold for measuring range 0 ... 2 bar [0 ... 30 psi] |
|---------------------------|---|

Output signal

Signal type

| | |
|------------------|-----------------------------------|
| Current (2-wire) | 4 ... 20 mA |
| Voltage (3-wire) | ■ DC 0 ... 5 V ■ DC 0 ... 10 V |

Load in Ω

| | |
|-----------------------------|--|
| Output signal 4 ... 20 mA | $\leq (\text{supply voltage} - 10 \text{ V}) / 0.02 \text{ A}$ |
| Output signal DC 0 ... 5 V | $> 5 \text{ k}\Omega$ |
| Output signal DC 0 ... 10 V | $> 10 \text{ k}\Omega$ |

Voltage supply

| | | |
|------------------------|--|----------------|
| Supply voltage | Output signal DC 0 ... 5 V / 4 ... 20 mA | DC 10 ... 30 V |
| | Output signal DC 0 ... 10 V | DC 14 ... 30 V |
| Power P_{max} | 1 W | |

Dynamic behaviour

| | |
|-------------------------|-----------------------|
| Rise time (10 ... 90 %) | $\leq 300 \text{ ms}$ |
|-------------------------|-----------------------|

Electrical connection

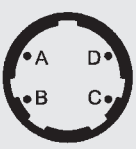
| Connection type | IP code ¹⁾ | Wire cross-section | Cable diameter | Cable lengths |
|------------------------------------|-----------------------|-------------------------------|----------------|---------------------------------|
| Bayonet connector (4-pin) | IP67 | - | - | - |
| Circular connector M12 x 1 (4-pin) | IP67 (NEMA 4) | - | - | - |
| Cable outlet | IP67 (NEMA 4) | 0.22 mm ² (AWG 24) | 4.8 mm | ■ 1.5 m [5 ft] ■ 3 m [10 ft] |
| Sub-D connector (9-pin) | IP54 | - | - | - |
| Sub-D HD connector (15-pin) | IP54 | - | - | - |

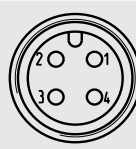
1) The stated IP codes only apply when plugged in using mating connectors that have the appropriate IP code.

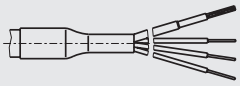
Further details on: Electrical connection

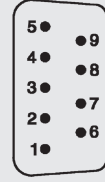
| | |
|--|-------------|
| Connection type | → See above |
| Wire cross-section | → See above |
| Cable diameter | → See above |
| Cable length | → See above |
| Pin assignment | → See below |
| Ingress protection (IP code) per IEC 60529 | → See above |
| Short-circuit resistance | S+ vs. U- |
| Reverse polarity protection | U+ vs. U- |
| Insulation voltage | DC 500 V |

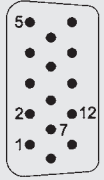
Pin assignment

| Bayonet connector (4-pin) | | | |
|---|----------------|--------|--------|
| | | 2-wire | 3-wire |
|  | U ₊ | A | A |
| | U ₋ | D | D |
| | S ₊ | - | B |

| Circular connector M12 x 1 (4-pin) | | | |
|---|----------------|--------|--------|
| | | 2-wire | 3-wire |
|  | U ₊ | 1 | 1 |
| | U ₋ | 3 | 3 |
| | S ₊ | - | 4 |

| Cable outlet | | | |
|---|----------------|--------|--------|
| | | 2-wire | 3-wire |
|  | U ₊ | Red | Red |
| | U ₋ | Black | Black |
| | S ₊ | - | Brown |

| Sub-D connector (9-pin) | | | |
|---|----------------|--------|--------|
| | | 2-wire | 3-wire |
|  | U ₊ | 4 | 4 |
| | U ₋ | 8/9 | 8/9 |
| | S ₊ | - | 1 |

| Sub-D HD connector (15-pin) | | | |
|--|----------------|--------|--------|
| | | 2-wire | 3-wire |
|  | U ₊ | 7 | 7 |
| | U ₋ | 5/12 | 5/12 |
| | S ₊ | - | 2 |

Legend

- U₊ Positive power supply terminal
- U₋ Negative power supply terminal
- S₊ Positive output terminal

| Material | |
|---|---|
| Material (wetted) | |
| Process connection | <ul style="list-style-type: none"> ■ 316L per SEMI F20 ■ 316L VIM/VAR |
| Thin-film sensor | 2.4711 / UNS R30003 |
| Material (in contact with the environment) | |
| Case | 304 SS |
| Surface treatment | Electropolished per SEMI F19 |
| Surface roughness Ra | |
| Typical | ≤ 0.13 μm (RA 5) |
| Maximum | ≤ 0.18 μm (RA 7) |





For the verification of material quality and origin in accordance with SEMI F20-0706, a certificate in accordance with EN 10204 clause 3.1 can be issued on request, with or without a sub-supplier certificate.

| Operating conditions | | | | |
|--------------------------------|--------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| Permissible temperature ranges | Non-Ex | T4 | T5 | T6 |
| Medium temperature limit | -20 ... +100 °C [-4 ... +212 °F] | -20 ... +85 °C [-4 ... +185 °F] | -20 ... +60 °C [-4 ... +140 °F] | -20 ... +40 °C [-4 ... +104 °F] |
| Ambient temperature limit | -20 ... +85 °C [-4 ... +185 °F] | -20 ... +85 °C [-4 ... +185 °F] | -20 ... +60 °C [-4 ... +140 °F] | -20 ... +40 °C [-4 ... +104 °F] |
| Storage temperature limit | -40 ... +100 °C [-40 ... +212 °F] | -20 ... +85 °C [-4 ... +185 °F] | -20 ... +85 °C [-4 ... +185 °F] | -20 ... +85 °C [-4 ... +185 °F] |

| Further details on: Operating conditions | |
|--|--|
| Permissible media | <ul style="list-style-type: none"> ■ Speciality gases ■ Vapours ■ Liquids |
| Helium leak test | < 1 x 10 ⁻⁹ mbar l/sec (atm STD cc/sec) per SEMI F1 |
| Ingress protection (IP code) per IEC 60529 | → See "Electrical connection" |
| Vibration resistance per IEC 60068-2-6 | 0.35 mm (10 ... 58 Hz) / 5 g (58.1 ... 2,000 Hz) |
| Shock resistance per IEC 60068-2-27 | 500 g (1.5 ms) |

| Packaging and instrument labelling | |
|------------------------------------|----------------------------------|
| Packaging | Double bagging per SEMI E49.6 |
| Assembly and packaging location | Clean room class 5 per ISO 14644 |
| Instrument labelling | WIKA product label, glued |

Approvals

| Logo | Description | Country |
|---|---|----------------|
|  | EU declaration of conformity | European Union |
|  | EMC directive EN 61326 emission (group 1, class B) and immunity (industrial environments) | |
| | 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] [II 3G Ex ec ic IIC T4/T5/T6 Gc X] | |
|  | IECEx (option) Hazardous areas - Ex n Zone 2 gas [Ex nA ic IIC T4/T5/T6 Gc] [Ex ec ic IIC T4/T5/T6 Gc] | International |
|  | 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 |

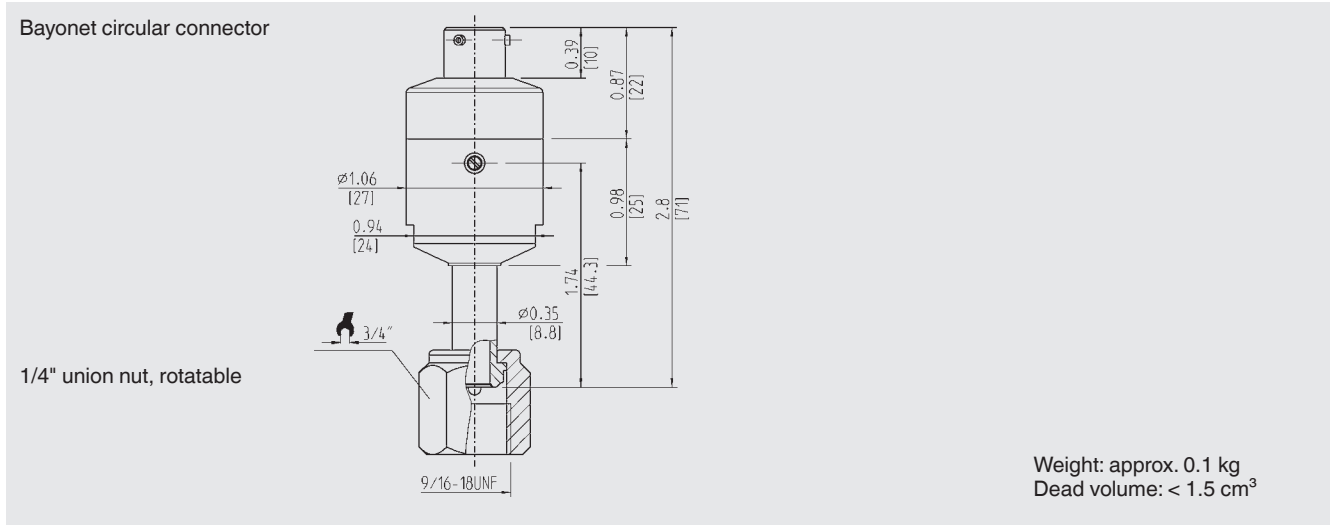
→ For approvals and certificates, see website

Safety-related characteristic values

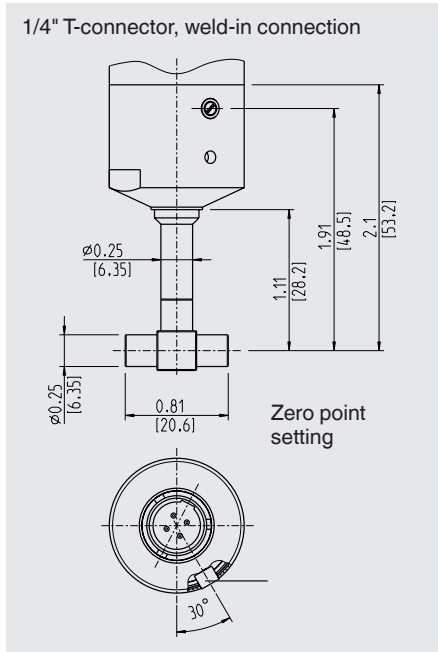
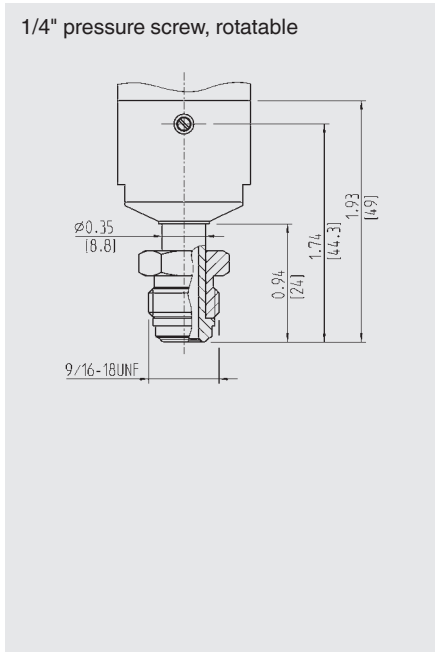
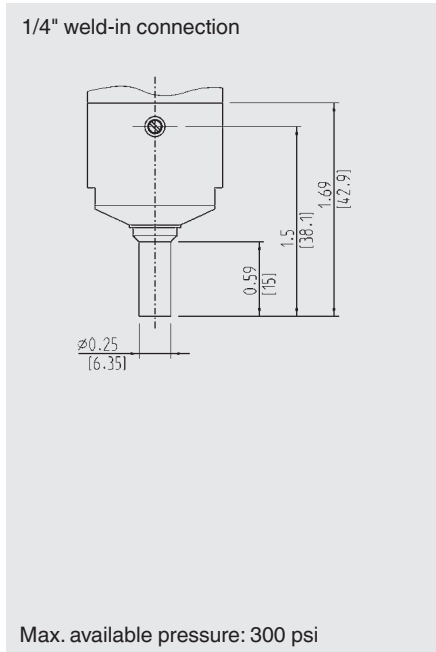
| Safety-related characteristic values | |
|--------------------------------------|-------------|
| MTTF | > 100 years |

Dimensions in inch [mm] WUC-10

Electrical connections

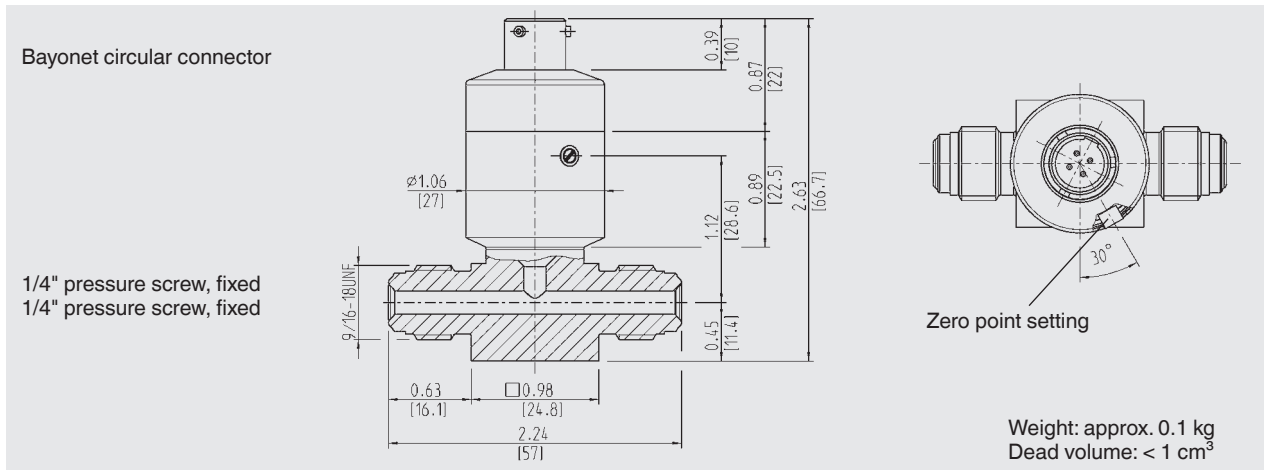


Process connections

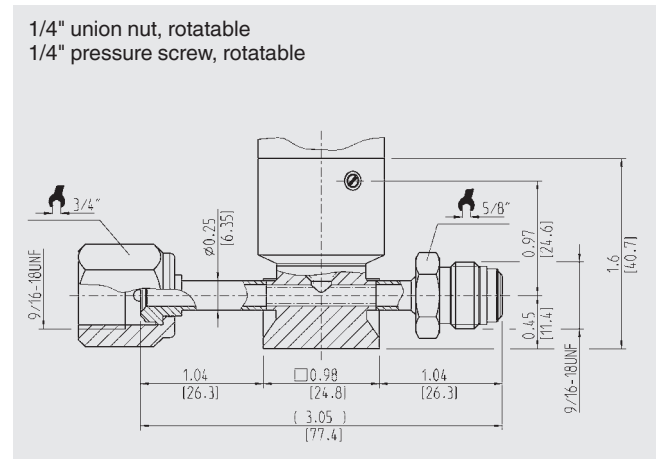
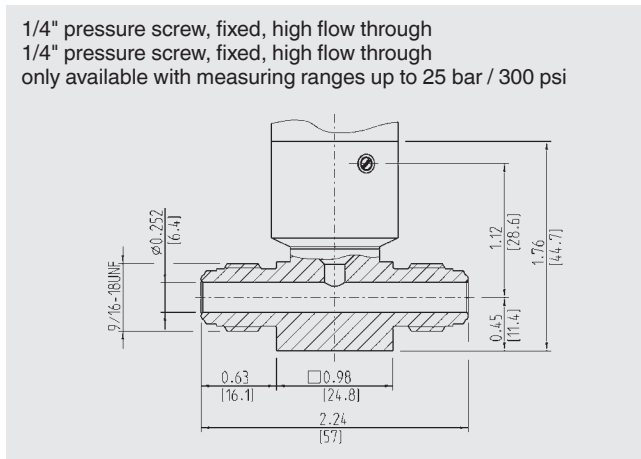
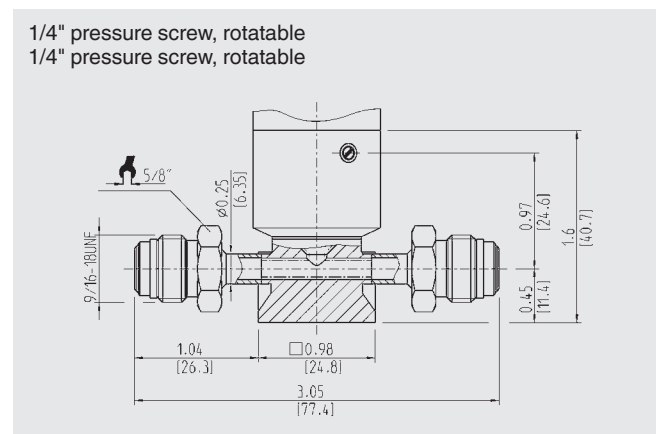
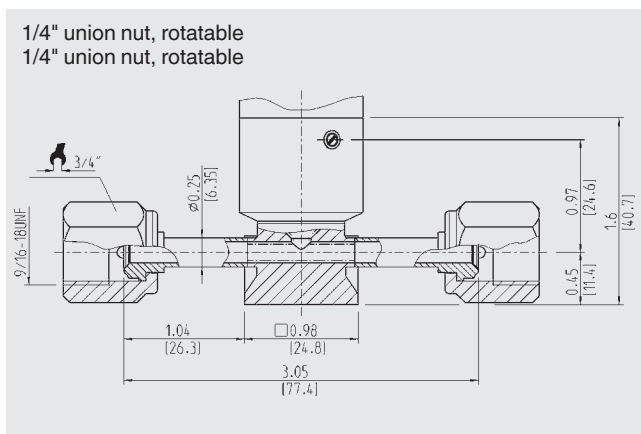


Dimensions in inch [mm] WUC-15

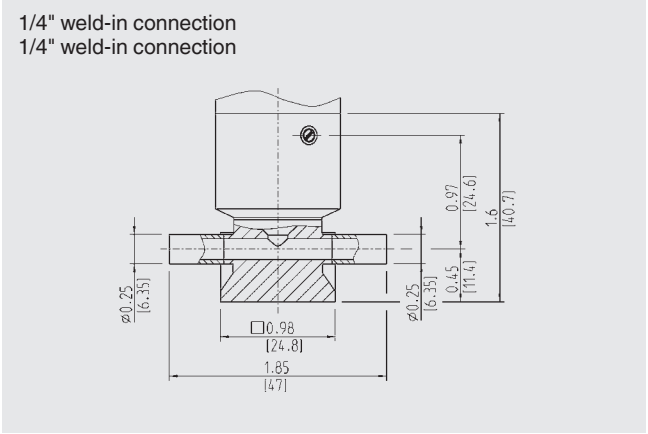
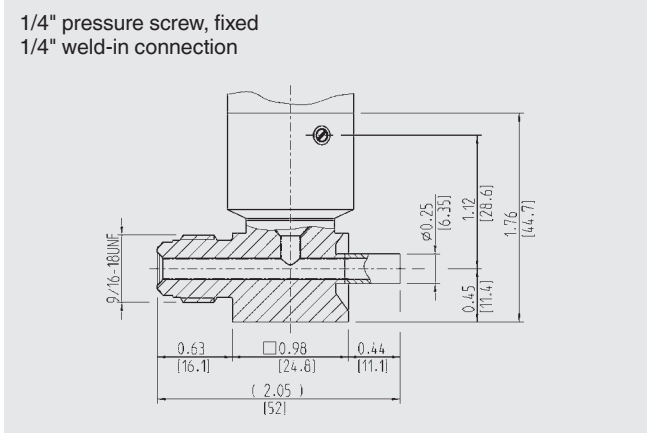
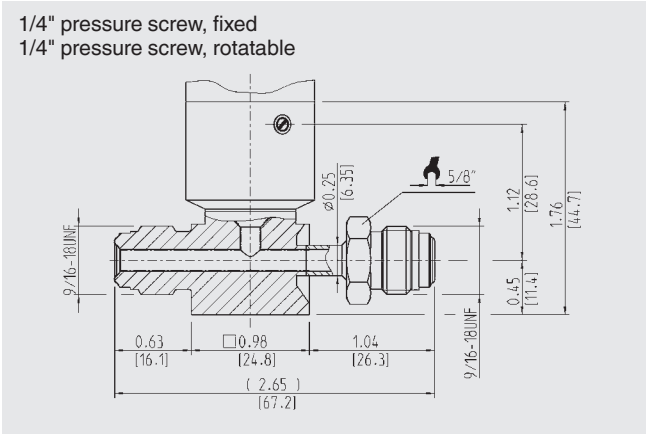
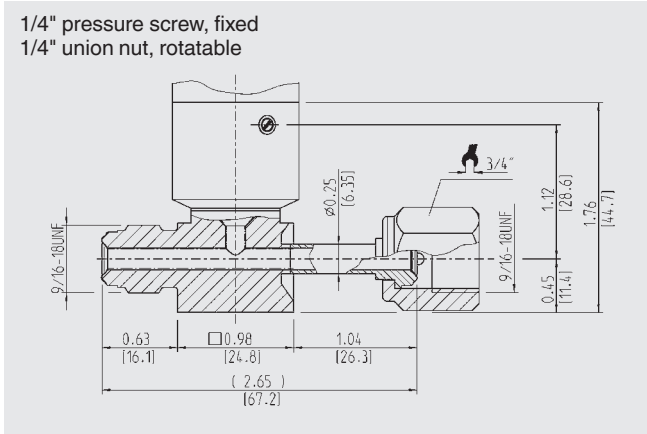
Electrical connections



Process connections

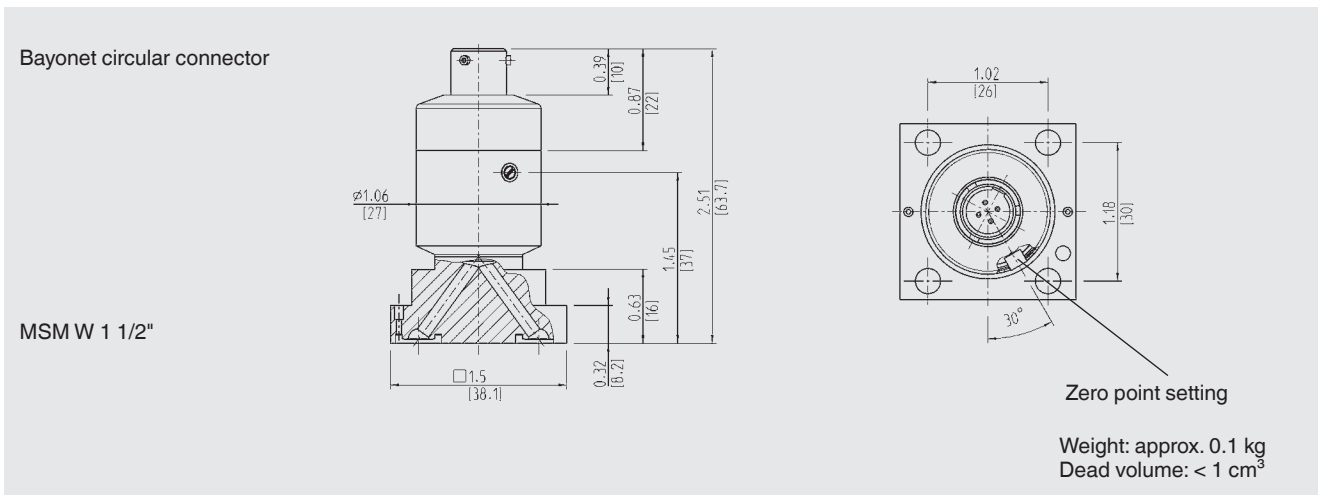


Process connections for WUC-15

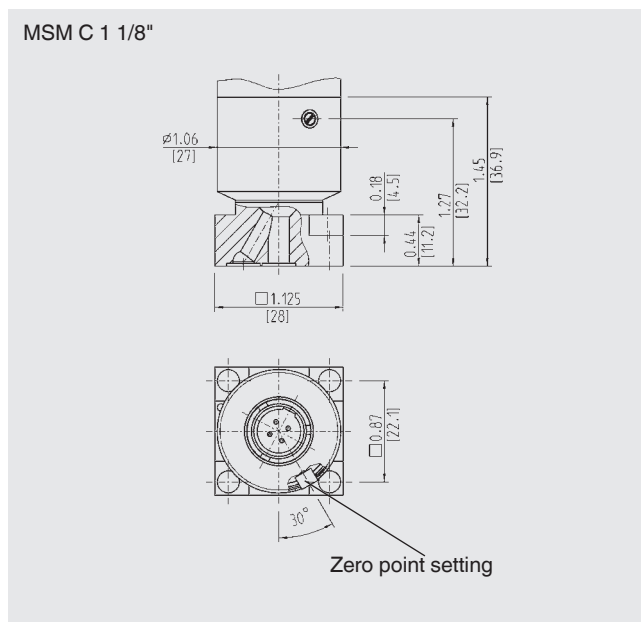
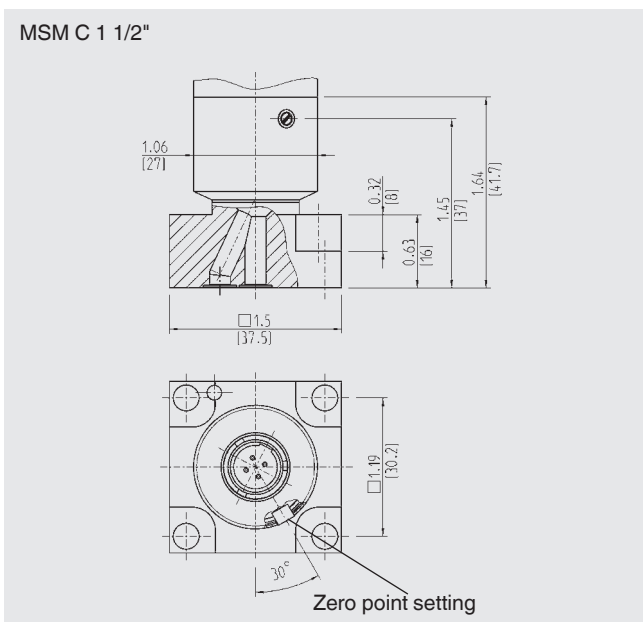


Dimensions in inch [mm] WUC-16

Electrical connections



Process connections



Ordering information

Model / Measuring range / Process connection / Output signal / Supply voltage / Electrical connection / Cable length / Approval

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