# Type M93X.D1 All-Welded System (AWS)



Type M93X.D1 all-welded gauge/diaphragm seal systems are a drop-in retrofit for existing gauges. This assembly eliminates all potential leak paths and has a tamper-resistant construction. The all-welded system is ideal for installations where tightly controlled fugitive emissions and safety are a concern. The M93X.D1 is well-suited for applications in the chemical, petrochemical and process industries.


**Type M93X.D1 AWS**

## Design

This all-welded gauge assembly is constructed using WIKA gauge model number 23X.34 and diaphragm seal model number L990.34. The diaphragm is recessed within the all-welded seal body. The pressure gauge is back-welded to the seal upper housing to eliminate another potential leak path. The threaded seal fill port has been removed to ensure a tamper resistantdesign. Additional process wetted materials, process connections, system fill fluids and accessories are available to meet the rigorous demands of most applications.

## Standard Features

**Construction**
All-welded design

**Pressure Rating, Maximum**
1,500 psi and 5,000 psi

**Ranges**
Vacuum, compound and positive pressure up to 5000 psi (See selection table for detail)

**Operating Temperature**
0 to 300°F (-18°C to 149°C)

**Ambient Temperature**
-40°F to 140°F (-40°C to 60°C)

## Gauge Features

**Dial Size**
4½" process gauge

**Process Connection**
¼" NPT & ½" NPT male or female

**Process Wetted Materials**
316L stainless steel

**Case Material**
Fiberglass reinforced thermoplastic (Pocan®)

**Case Fill**
Glycerin (optional)

**Window**
Acrylic

**Dial**
White aluminum with black lettering

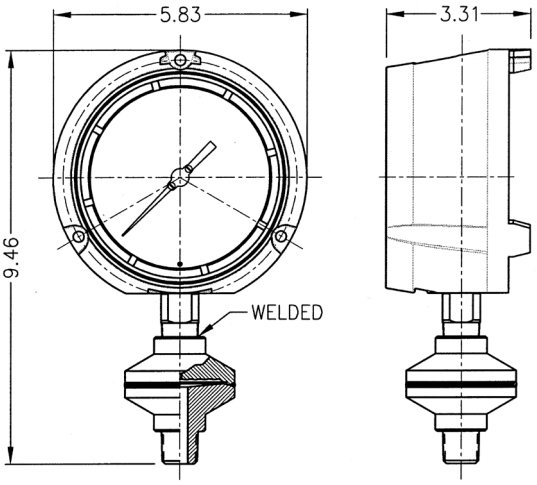
**Pointer**
Black aluminum

**Accuracy**
±0.5% of span

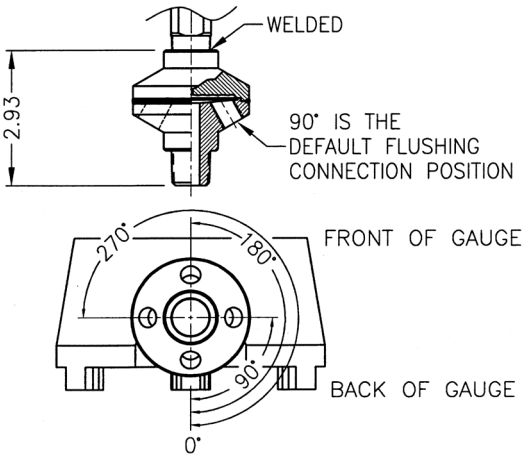
**Temperature effect**
Process and ambient change, see Technical Data, page 2

**System Fill Fluid**
Silicone oil, KN68 - DC200-10cSt.
Identification: Engraved on upper seal housing

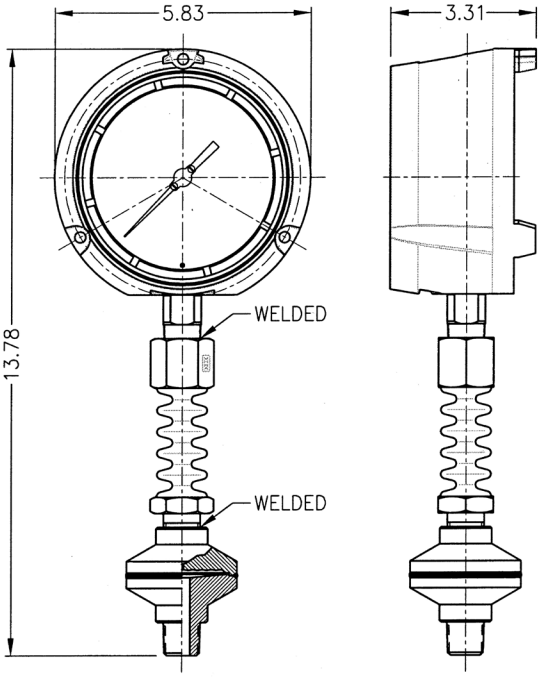
## Standard Configuration



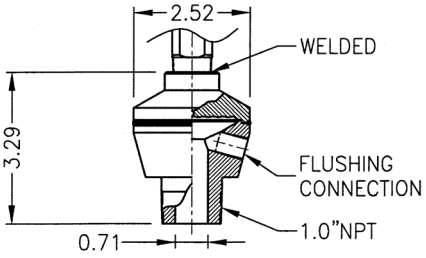

## Flushing Port Location




## 4" Cooling Element installed




## Ethanol Configuration




**Technical Data**
Overall weight: No case fill: 3.50 lbs. Case filled: 4.60 lbs.

Temperature effect[2)]

| Fill fluid | KN68 | KN7 | KN2 | KN59 | KN21 | KN3.2[1)] | |
|---|---|---|---|---|---|---|---|
| Ambient | 0.21 | 0.10 | 0.21 | 0.20 | 0.18 | 0.16 | PSI per 10°F change |
| Process | 0.04 | 0.02 | 0.04 | 0.03 | 0.03 | 0.04 | |

1) Values including 4" cooling element
2) Units filled at 70°F (base temperature)

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| Field no. | Code | Description |
|---|---|---|
| | | **Nominal Pressure Range** |
| | V000 | -30inHg … 0 Vacuum |
| → | C015 | -30inHg … 15 psi Compound range |
| | C030 | -30inHg … 30 psi Compound range |
| | C060 | -30inHg … 60 psi Compound range |
| | C100 | -30inHg … 100 psi Compound range |
| | C160 | -30inHg … 160 psi Compound range |
| → | P015 | 0 psi … 15 psi Gauge pressure range |
| → | P030 | 0 psi … 30 psi Gauge pressure range |
| | P060 | 0 psi … 60 psi Gauge pressure range |
| | P100 | 0 psi … 100 psi Gauge pressure range |
| | P160 | 0 psi … 160 psi Gauge pressure range |
| | P200 | 0 psi … 200 psi Gauge pressure range |
| | P300 | 0 psi … 300 psi Gauge pressure range |
| | P400 | 0 psi … 400 psi Gauge pressure range |
| | P600 | 0 psi … 600 psi Gauge pressure range |
| | P800 | 0 psi … 800 psi Gauge pressure range |
| | P10C | 0 psi … 1000 psi Gauge pressure range |
| | P15C | 0 psi … 1500 psi Gauge pressure range |
| | P20C | 0 psi … 2000 psi Gauge pressure range |
| | P30C | 0 psi … 3000 psi Gauge pressure range |
| 1 | P50C | 0 psi … 5000 psi Gauge pressure range |
| | | **Pressure Units** |
| → | PX | PSI - Single scale |
| | CX | KG/CM² - Single scale |
| | KX | KPA - Single scale |
| | BX | BAR - Single scale |
| | PC | PSI outside/KG/CM² inside in red |
| | PK | PSI outside/KPA inside in red |
| | PB | PSI outside/BAR inside in red |
| 2 | SP | Special scale - consult factory |
| | | **Process Connection** |
| | N2F | 1/4" NPT female |
| → | N4F | 1/2" NPT female |
| | N6F | 3/4 NPT female |
| | N8F | 1" NPT female |
| | N4 | 1/2" NPT male |
| | N6 | 3/4" NPT male |
| | N8 | 1" NPT male |
| 3 | XX | Other - consult factory |

| Field no. | Code | Description |
|---|---|---|
| | | **Upper Housing Material** |
| → | SS | Stainless steel 316L (1.4435) |
| | MO | Monel® 400 (2.4360) |
| | HC | Hastelloy® C276 (2.4819) |
| | DP | Duplex 2205 (1.4462) |
| 4 | XX | Other - consult factory |
| | | **Lower Housing Material** |
| → | SS | Stainless steel 316L (1.4435) |
| | HC | Hastelloy® C276 (2.4819) |
| | MO | Monel® 400 (2.4360) |
| | IN | Inconel® 600 (2.4816) |
| | IC | Incoloy 825 (2.4858) |
| | CA | Carpenter 20 (2.4660) |
| | DP | Duplex 2205 (1.4462) |
| | NI | Nickel 200 (2.4066) |
| | S4 | Stainless steel 304L (1.4304) |
| 5 | XX | Other - consult factory |
| | | **Lower Housing Flushing Connection** (see note 1) |
| | -0 | Without |
| | -1 | 1 X 1/8 NPT |
| → | -2 | 1 X 1/4 NPT |
| | -3 | 2 x 1/8 NPT |
| 6 | -4 | 2 x 1/4 NPT |
| | | **Diaphragm Material** |
| → | SS | Stainless steel 316L (1.4435) |
| | HB | Hastelloy® B3 (2.4600) |
| | HC | Hastelloy® C276 (2.4819) |
| | MO | Monel® 400 (2.4360) |
| | IN | Inconel® 600 (2.4816) |
| | IC | Incoloy 825 (2.4858) |
| | NI | Nickel 200 (2.4066) |
| | CA | Carpenter 20 (2.4660) |
| | DP | Duplex 2205 (1.4462) |
| | S4 | Stainless steel 304L (1.4304) |
| 7 | XX | Other - consult factory |
| | | **System Fill** |
| | 68 | KN68 - Silicone DC200-10cSt |
| | 02 | KN2 - Silicone DC200-50cSt |
| | 32 | KN32 - Silicone DC704 |
| | 21 | KN21 - Halocarbon 6.3 |
| → | 07 | KN7 - Glycerin 99.7% USP (1000cSt) (see note 3) |
| | 92 | KN92 - Medicinal white mineral oil (23cSt) |
| 8 | XX | Other - consult factory |

| M93X.D1 Selection Guide - Page 2 | | |
|---|---|---|
| **Field no.** | **Code** | **Description** |
| | | **Options -** (see note 4) |
| | FG1 | Glycerin, 99.7% case fill - change model # to M933.D1 |
| | FS1 | Silicone 1000cSt case fill - change model # to M933.D1 |
| | LSG | Laminated safety glass window |
| | XMT | Material Certificate 3.1 EN10204 (metal only) |
| | XNC | Wetted Parts NACE (MR0175/MR0103 Year 2009) compliant |
| | WSS | Instrument tag, stainless steel |
| | LBM | Lower back mount gauge connector |
| | RS3 | Super restrictor, 0.3 mm orifice |
| | PDP | Drag pointer, removable key |
| | CE4 | 4" Cooling element - (see note 5) |
| | CE8 | 8" Cooling element - (see note 5) |
| 9 | PLG | Provide flushing port plugs |

Notes:
1) Plugs are not supplied with flushing ports as standard.
2) Diaphragm material should match the lower housing material. Please contact the factory for exceptions.
3) Glycerin (07) is not available for vacuum & compound pressure measurement ranges. Consult factory for exceptions.
4) List options in alphabetical order at the end of the configuration code.
5) Cooling element are only offered with 316L stainless steel upper housings.

**Order Sample**

| MODEL | PRESSURE RANGE | PRESSURE UNIT | PROCESS CONNECTION | UPPER HOUSING MATERIAL | LOWER HOUSING MATERIAL | FLUSHING CONNECTION | DIAPHRAGM MATERIAL | SYSTEM FILL | OPTIONS |
|---|---|---|---|---|---|---|---|---|---|
| **M933.D1** | **P200** | **PX** | **N4** | **SS** | **SS** | **-0** | **SS** | **68** | **FG1** |
| **Field no.** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |





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