

Diaphragm monitoring system with threaded connection

For the chemical and petrochemical industries

Model DMS34

WIKA data sheet DS 95.18

Applications

- Chemical/petrochemical industry, oil/gas industries
- For applications with hydrofluoric acid content
- For aggressive and critical media
- Pressure/vacuum measurement on pipelines or vessels

Special features

- Double-diaphragm system to ensure the separation of the process and the pressure measuring instrument
- Process connection with thread to provide for direct threaded connection
- All welded version with internal diaphragm
- System from Monel

Description

The WIKA combination of diaphragm seal, pressure measuring instrument and monitoring element is ideally suited for the harshest measuring tasks. The system can withstand aggressive, contaminated or hot media and ensures a secure connection between the medium and the diaphragm monitoring system.

The patented diaphragm monitoring has been designed specifically for the highest safety requirements in the chemical and petrochemical industries.

On the double-diaphragm system a second, internal diaphragm in the pressure measuring instrument ensures the reliable separation of the environment and the process in the event of a diaphragm rupture. The measuring function of the overall system remains unrestricted, nevertheless it must be replaced immediately.



Diaphragm monitoring system, model DMS34

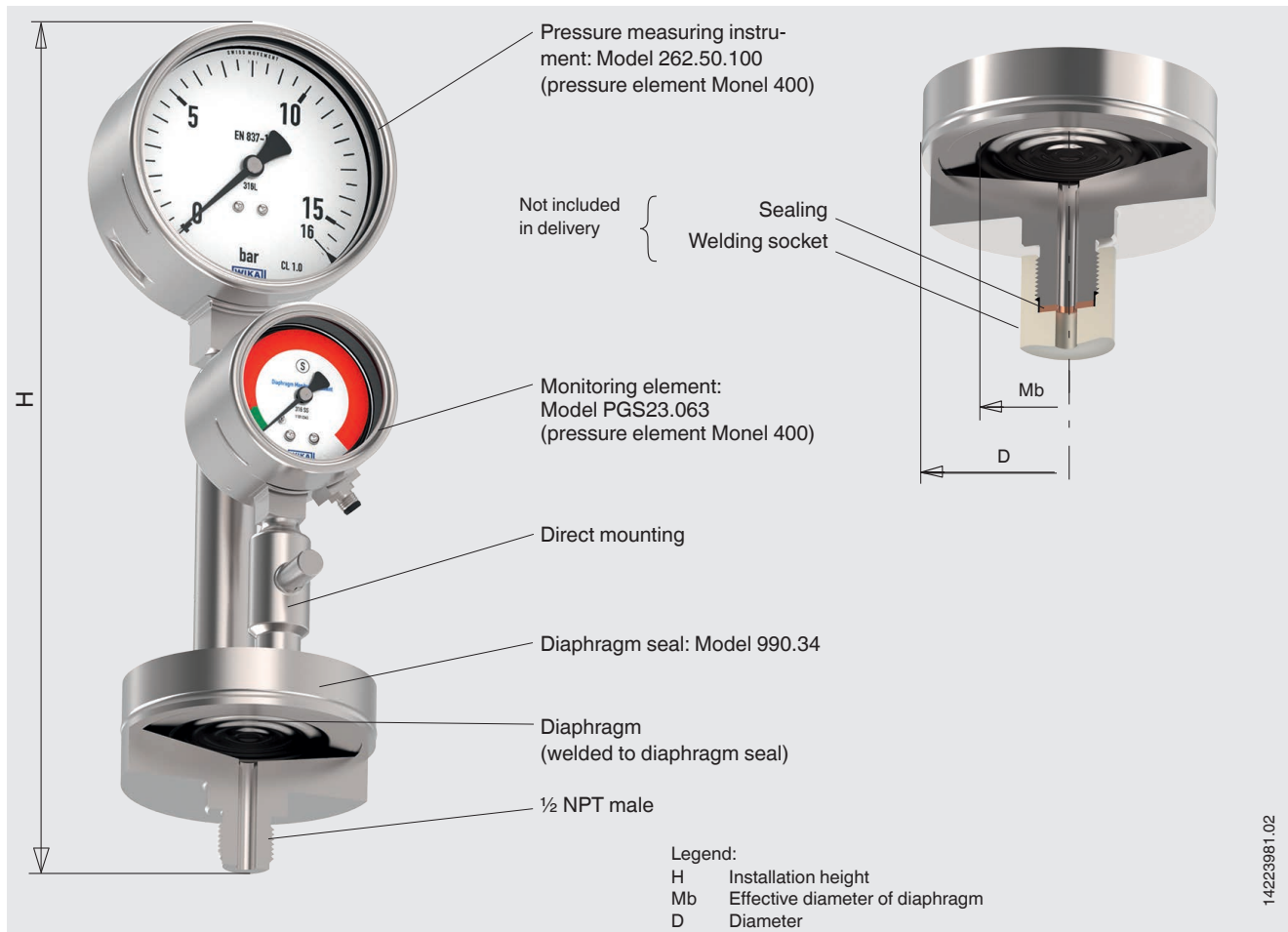
Mounting of the diaphragm seal to the pressure measuring instrument is made as direct mounting as standard. A fluid inside the system, which is explicitly chosen to suit the particular application, hydraulically transmits the pressure to the pressure measuring instrument.

Diaphragm monitoring systems with the WIKA model 990.34 diaphragm seals are used successfully in applications with hydrofluoric acid content.

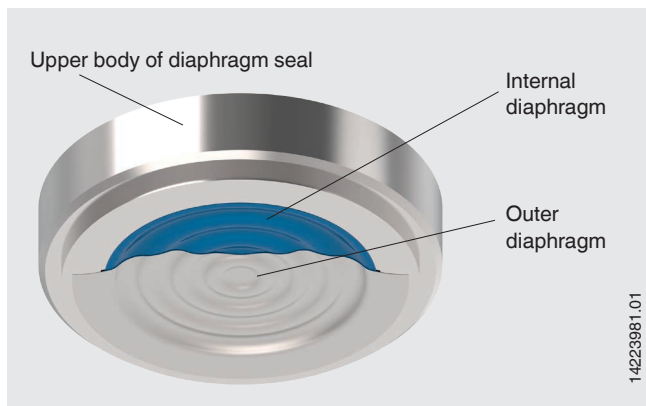
The model DMS34 is a patented WIKA development, see e.g. patent DE 19949831, and is subject to further pending patents, e.g. US 2018180505, DE 102016015447, CN 108240885.

Illustrative example of a diaphragm monitoring system

The diaphragm monitoring system is a combination of pressure measuring instrument and diaphragm seal with an additional monitoring element for the diaphragm condition.



Functional principle of diaphragm monitoring



Diaphragm rupture

In the event of a diaphragm rupture, the pressure monitored in the intermediate space increases. As soon as the display of the monitoring element exceeds the preset limit value, an electrical/optical alarm signal is issued. This signals a diaphragm rupture.

WIKA's double-diaphragm design is the solution for critical processes where neither the medium should find its way into the environment, nor should the system fill fluid find its way into the product.

Normal operation

In normal operation, the pressure measurement and the diaphragm monitoring operate without limitations within the performance limits of the overall system design. The space between the two diaphragms is evacuated. This vacuum is measured with the monitoring element and the status is displayed in the green area; there is no electrical alarm signal.

Safety

The measuring technology of the monitoring element withstands the process pressure despite the diaphragm rupture. The measuring function of the overall system remains unrestricted. The process reliability is guaranteed because the materials of the two diaphragms are made of the same material as the wetted parts of the diaphragm seal. The overall system is, nevertheless, damaged and must be replaced immediately.

Specifications

| Diaphragm seal system | |
|---|--|
| Version | Pressure measuring instrument welded to diaphragm seal |
| Scale range | |
| Gauge pressure | 0 ... 2.5 bar (0 ... 40 psi) 0 ... 4 bar (0 ... 60 psi) 0 ... 6 bar (0 ... 1.000 psi) 0 ... 10 bar (0 ... 150 psi) 0 ... 16 bar (0 ... 250 psi) 0 ... 25 bar (0 ... 400 psi) 0 ... 40 bar (0 ... 600 psi) |
| Vacuum ¹⁾ | -1 ... +1.6 bar (-30 inHg ... +25 psi) -1 ... +3 bar (-30 inHg ... +45 psi) -1 ... +5 bar (-30 inHg ... +70 psi) -1 ... +10 bar (-30 inHg ... +145 psi) -1 ... +15 bar (-30 inHg ... +220 psi) -1 ... +25 bar (-30 inHg ... +360 psi) |
| Permissible temperature range | |
| Medium | 10 ... 150 °C (50 ... 302 °F) |
| Ambient | 10 ... 40 °C (50 ... 104 °F) |
| Storage | 10 ... 60 °C (50 ... 140 °F) |
| Ingress protection per IEC/EN 60529 | IP65 |
| Material ²⁾ wetted | Diaphragm: Monel 400 2.4360; UNS 04400 Diaphragm seal: Monel 400 2.4360; UNS 04400 |
| Mounting type | Direct mounting |
| Level of cleanliness of wetted parts | Oil and grease free per ASTM G93-03 level F WIKA standard (< 1,000 mg/m ²) |
| System fill fluid | KN 21 halocarbon |

1) Under vacuum, the diaphragm monitoring function is only possible to a limited extent

2) Other materials on request

| Monitoring element ³⁾ | Switch contact and dial with red/green areas (contact pressure gauge, model PGS23.063) | Dial with red/green areas (Bourdon tube pressure gauge, model 232.30.063) |
|--|---|---|
| Dial display | Pointer in green range → Outer diaphragm intact Pointer in red range → Outer diaphragm defective | |
| Nominal size | 63 (2.5") | |
| Material | | |
| Case | Stainless steel, with solid baffle wall (Solidfront) and blow-out back | |
| Pressure element | Monel 400 2.4360; UNS 04400 | |
| Movement | Stainless steel | |
| Bayonet ring | Stainless steel | |
| Pointer/dial | Aluminium | |
| Window | Laminated safety glass | |
| Switch behaviour | Switch point set to -0.2 bar rel. and rising pressure Switch point not reached → Outer diaphragm intact Switch point reached → Outer diaphragm defective | Without |
| Switch contact | Reed switch model 851 No control unit and no power supply required Direct switching up to 150 V, 0.5 A Also suitable for direct triggering of a programmable logic controller (PLC) Free from wear as without contact | Without |
| Electrical connection | Cable bushing with 2 m cable (optional connectors available on request) | Without |
| Ingress protection per IEC/EN 60529 | IP65 | IP54 |

3) In the event of a diaphragm rupture, the diaphragm monitoring is specified for process pressures ≥ 0 bar rel.

The model PGS23.063 is recommended, since the electrical switch contact can be used for external alarm devices
For further information on the models PGS23.063 and 232.30.063 see data sheets PV 22.03 and PM 02.04

Pressure measuring instrument: Bourdon tube pressure gauge model 262.50.100

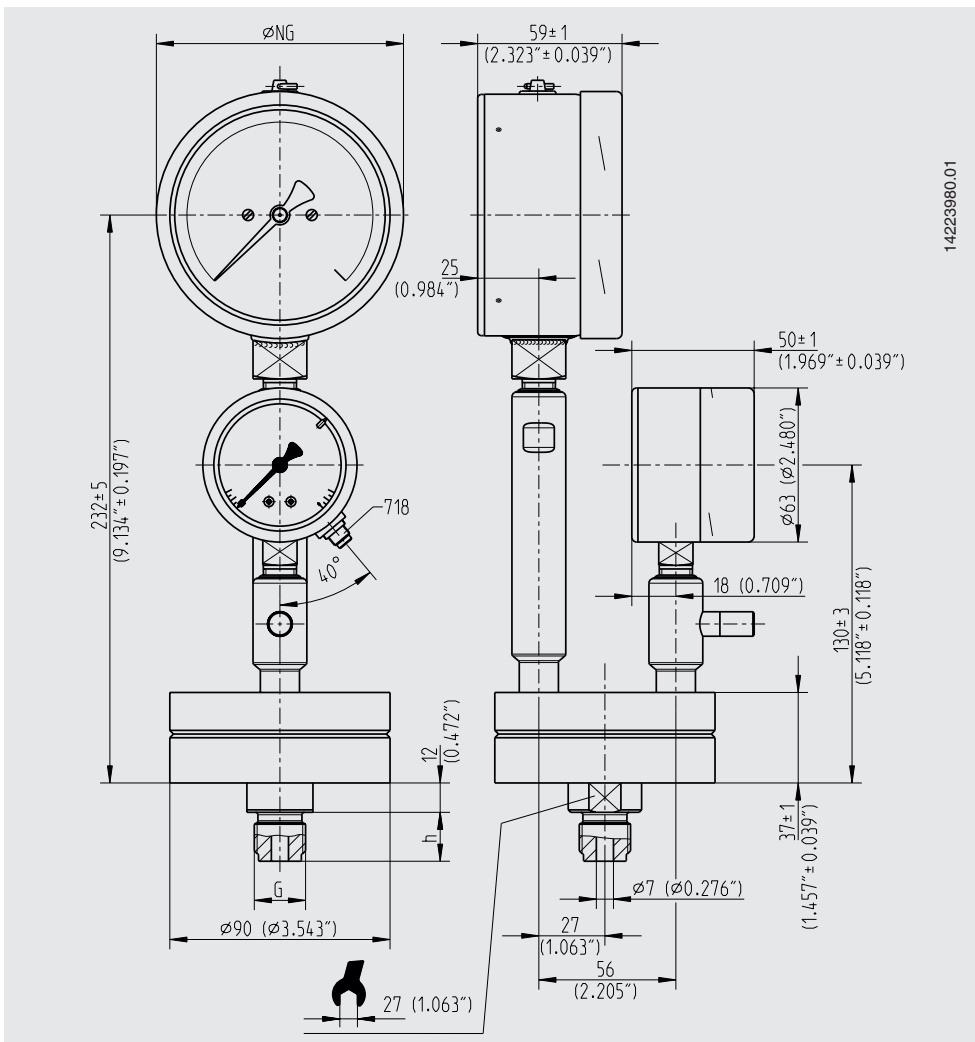
| | | |
|--|-----------------------------------|------------------------|
| Nominal size | 100 mm (4.0") | |
| Pressure limitation | Steady: | 3/4 x full scale value |
| | Fluctuating: | 2/3 x full scale value |
| | Short time: | Full scale value |
| Material | | |
| Case/bayonet ring | Stainless steel 316L | |
| Pressure element | Monel 400 | |
| Movement | Stainless steel 316L | |
| Dial | Aluminium, white, black lettering | |
| Adjustable pointer | Aluminium, black | |
| Window | Laminated safety glass | |
| Ingress protection per IEC/EN 60529 | IP65 | |

For further information on model 262.50.100 see data sheet PM 02.02

Diaphragm seal: Model 990.34

| | |
|-----------------------------------|---|
| Type of process connection | DN 72 PN 40, threaded connection, male thread 1/2 NPT |
|-----------------------------------|---|

Dimensions in mm (in)



Other versions on request

Certificates (option)

- 2.2 test report per EN 10204
(e.g. surface finish quality of wetted parts)
- 2.2 certification per NACE MR 1705 and MR 103
- 3.1 inspection certificate per EN 10204
(e.g. material proof, wetted metal parts with suppliers' certificate (melting analysis), measurement accuracy: Listing of the single measured values)
- Others on request

Patents, property rights

- Diaphragm monitoring for diaphragm seals
(US 2018180505, DE 102016015447,
CN 108240885, NL 2019251)
- Diaphragm of diaphragm seal (DE 19949831)

Approvals and certificates, see website

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