

Contents

1. General Instructions
 2. Safety Instructions
 3. Description, Application
 4. Technical Data
 5. Installation
 - Storage and Transport
 - Mounting
 - Mechanical Connection
 - Electrical Connection
 6. Operating
 7. Maintenance, Repairs
 8. Shut-down
 9. Waste Disposal
- Appendix Capacity Data



1. General Instructions

Please read these instructions before operating the device. SF₆ Gas Density Monitors are measuring instruments with electrical limit switches bearing the CE mark. Compliance of manufacture with the relevant standards in force is documented.

They are designed and manufactured for special application conditions and are to be used only in said conditions.



Any applications other than those mentioned are not allowed!

The ARMATURENBAU GmbH and MANOTHERM Beierfeld GmbH are not liable for any damage owing to the improper use of the device or when disregarding the information provided in these instructions.

2. Safety Instructions



Strictly follow the relevant national safety standards in force when mounting, commissioning and operating these devices (e.g. VDE 0100).

Devices are to be de-energized before performing any work on them.

Connections are to be made only by specialized technical personnel.

Disregarding the relevant regulations may cause major injuries and/or damage to property.

Only duly qualified technical personnel is allowed to work on these devices.

The devices are to be de-pressurized and de-energized before being mounted and dismantled.

3. Description, Application

Gas Density Monitors for SF₆ gas are specifically designed pressure gauges with an electrical auxiliary component.

They combine the functions of pressure measurement and limit switching in a single device. The influences of the ambient temperature are compensated by a special compensating system. The Gas Density Monitors are calibrated for the particular, individual application referring filling pressure, calibration pressure and switching points.

The integrated limit switch contact assemblies are control switches that close or open the connected electrical circuits. They are joined to a contact arm which is moved by the pressure pointer.

4. Technical Data

Nominal case size: 100 mm

Weight: approx. 0.95 kg (2.09 lb) when filled with gas

approx. 1.15 kg (2.53 lb) when filled with oil

Process connection G 1/2 B (1/2" BSP), G 3/8 B (3/8" BPS), or M20x1.5

Standard temperature range: -30 to +70°C (-22 to 158 °F)

Further details see data sheet 1902.

Limit switch contact data, see attached table

5. Installation

Storage and Transport

- Storage temperature limits: -40 °C/+70 °C (-40 °F/+158 °F)
- The gas density monitors can heat up or cool down during transport and storage. This can lead to pointer movements which prove that the compensation system works and is hence absolutely normal.
- Density monitors are to be protected against mechanical damage during transport and storage. They are to be left in the original packaging until the moment of use.
- The packaging should be retained in case the devices need to be transported in the future in order to provide adequate protection against damage. If no longer needed, the packaging is to be disposed of accordingly by type.

Mounting

Check whether the device is appropriate for the specific application. Connect the device mechanically and electrically.

In order to make sure that the devices have duly adapted to the ambient temperature, they must be left at atmospheric pressure for at least 2 hours at a temperature of ± 20 °C (+68 °F). The pointer will then be located within the tolerance range mark (pay attention to the device's nominal position!).

Mechanical Connection

- As per general technical standards for pressure measuring instruments, e.g. EN 837-2
- Apply force only on spanner flats using an appropriate tool
- Do **not** apply any force on the casing or universal plug connector
- Ensure proper sealing to the process by means of gaskets of an appropriate material (standard: aluminum or copper gaskets).

Electrical Connection

- Mounting and electrical connection must be performed only by qualified technical personnel.

The layout of the connections and the switching function diagram are illustrated on the nameplate. The terminals and earthing terminal are duly marked.



The cross-section of the mains connection line has to be designed for maximum power consumption and must comply with IEC 227 or IEC 245.

No overcurrent protection devices are incorporated in the devices.

If protection devices are required, we recommend the following values as per EN 60 947-5-1:

Voltage 24 V: 2 A

Voltage 250 V: 1 A

These values refer to M micro-fuses and a maximum short-circuit current of 100 A.



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B33
07/06

6. Operating

SF₆ Gas Density Monitors can be applied in standard temperature range depending on the density of the SF₆ gas.

The limit switch contacts on SF₆ Gas Density Monitors are set and secured at the factory to prevent unintentional alteration of the limit values. It is not possible to alter these values subsequently.

We recommend following the contact loads listed in the attached table to ensure lasting and safe functioning.

7. Maintenance, Repairs

These devices do not require maintenance.

All you need is a moist cloth for cleaning. Before cleaning the inside of the cable socket or the connector, make sure that the device is de-energized.

Before switching the power on again, make sure that all parts are dry.



The devices must not be opened to avoid display and switching errors.

Any required repairs are to be performed only by the manufacturer.

In case of complaints specify the article and serial number as well as the period of manufacture. The serial number and period of manufacture are printed on the dial, while the article number can be found on the nameplate.



When providing details on measurements always specify the air pressure and temperature as well as the details of the reference device used (type and class of accuracy).

The Density Monitors are to be left to adjust at a temperature of 20 °C ± 2 K (+68 °F ± 3.6) before performing measurements (min. 2 hours).

8. Shut-down

In case of shut-down remove the device from the area of application.



The device is to be de-pressurized and deenergized when dismantling it.

9. Waste Disposal



Please help us to protect the environment and dispose of or recycle the used materials according to the relevant regulations in force.

All rights reserved to make technical modifications.

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Appendix Capacity Data

Limit values for contact load (as per EN 60947-5-1:1991):

Limit values for contact load in case of resistive load	Magnetic contact	
	Gas-filled instruments	Liquid-filled instruments
Rated insulation voltage	60 < U _i < 250 V	60 < U _i < 250 V
Rated operating voltage U _{eff}	max. 250 V	max. 250 V
Nominal operating current:		
Making current	1.0 A	1.0 A
Breaking current	1.0 A	1.0 A
Permanent current	0.6 A	0,6 A
Switching capacity	30 W 50 VA	20 W 50 VA

Do not exceed the specified voltage, current and power limits!

Recommended contact load

Voltage as per DIN IEC 38	Magnetic spring contact					
	Gas-filled devices			Liquid-filled devices		
	Resistive load		Inductive load Alternating current cos φ > 0.7	Resistive load		Inductive load Alternating current cos φ > 0,7
DC voltage/ AC voltage V	Direct current mA	Alternating current mA	mA	Direct current mA	Alternating current mA	mA
230	100	120	65	65	90	40
110	200	240	130	130	180	85
48	300	450	200	190	330	130
24	400	600	250	250	150	150

In case of low voltages, the switching current should not be less than 20 mA for reasons of switching reliability.



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