# Operating Instructions

# for

# Differential Pressure Gauges with Bourdon Tube

## Model: MAN-DF...

We don't accept warranty and liability claims neither upon this publication nor in case of improper treatment of the described products.

The document may contain technical inaccuracies and typographical errors. The content will be revised on a regular basis. These changes will be implemented in later versions. The described products can be improved and changed at any time without prior notice.


# 1. Contents



**Manufactured and sold by:**

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# 2. Note

Please read these operating instructions before unpacking and putting the unit into operation. Follow the instructions precisely as described herein.
The instruction manuals on our website www.kobold.com are always for currently manufactured version of our products. Due to technical changes, the instruction manuals available online may not always correspond to the product version you have purchased. If you need an instruction manual that corresponds to the purchased product version, you can request it from us free of charge by email (info.de@kobold.com) in PDF format, specifying the relevant invoice number and serial number. If you wish, the operating instructions can also be sent to you by post in paper form against an applicable postage fee.

Operating instructions, data sheet, approvals and further information via the QR code on the device or via www.kobold.com

The devices are only to be used, maintained and serviced by persons familiar with these operating instructions and in accordance with local regulations applying to Health & Safety and prevention of accidents.

## 2.1 Notes on the machine and pressure equipment directive

When used in machines, the MAN-D should be used only when the machines fulfil the EC-machine guidelines.

**as per PED 2014/68/EU**

"Pressure gauges with a volume ≤ 0.1 L"
In acc. with Article 4 Paragraph (3), "Sound Engineering Practice", of the PED 2014/68/EU no CE mark.

Diagram 2
Vessels referred to in Article 4(1)(a)(i), second indent

# 3. Instrument Inspection

Instruments are inspected before shipping and sent out in perfect condition.
Should damage to a device be visible, we recommend a thorough inspection of the delivery packaging. In case of damage, please inform your parcel service / forwarding agent immediately, since they are responsible for damages during transit.

**Scope of delivery:**
The standard delivery includes:
- Differential Pressure Gauges with Bourdon Tube model: MAN-DF...

# 4. Regulation Use

Any use of the Differential Pressure Gauges with Bourdon Tube, model: MAN-DF, which exceeds the manufacturer's specification, may invalidate its warranty. Therefore, any resulting damage is not the responsibility of the manufacturer. The user assumes all risk for such usage.

# 5. Operating Principle

These KOBOLD pressure gauges are suitable for measuring of liquid and gaseous medias, although this should not be viscous or susceptible to crystallization. These are used wherever the primary pressure, the after-pressure and the resulting pressure differential are to be displayed at the same time. A cheaper available alternative to the differential pressure gauge that uses a diaphragm is the model with direct display of the differential pressure.

# 6. Mechanical Connection

- In accordance with the general technical regulations for pressure gauges (i.e. EN 837-2 „Selection and installation recommendations for pressure gauges").

Wherever possible, the measuring instruments should be mounted close to the measuring point, mounted vibration-free and protected against damage, coarse contamination, moisture, strong temperature fluctuations and unilateral heat radiation. Permissible ambient temperature and medium temperature see technical data.
The differential pressure gauges must be aligned horizontally and mounted according to dimensional drawings.
The freezing point of the medium must be observed and a frost-free location selected.

# 7. Electrical Connection

(for devices with additional electrical equipment)

Via screw terminals in the cable connection box according to the wiring diagram on the housing periphery.

# 8. Operation

After installation, the pressure pipes should be blown through. Nominal diameter of the pressure pipes 4 - 9 mm clear width depending on the pressure and distance from the measuring location. For liquid media, the test leads should be vented.
Shut-off valves should be installed before the differential pressure gauges. To allow checking, shutting off or replacing. Shut-off valves with bypass are not necessary with Bourdon tube differential pressure gauges.
After commissioning the system, the shut-off valves are slowly opened. One-sided loading is not critical if the overload safety is maintained.

## 8.1 Check for leaks

After commissioning, a differential pressure is displayed. Close the positive and negative leads at the pressure tapping point. The pointer must stay within the scale field.
If a pointer falls off, this side is leaking or the shut-off valve is not properly closed.
As the indicator increases, the shut-off valve is leaking. If the system is under pressure, a rash must occur. If this is not the case, the meter is defective.

## 8.2 Shock absorption

In order to protect the devices against excessive wear in the case of pulsed measuring media, manometer throttles with adjustable throttle nail, capillary throttle coils, sintered metal filters or other damping device can be connected upstream.

## 8.3 Application Note

For dangerous media, such as oxygen, acetylene, combustible or toxic substances, as well as in sewage treatment plants, pressure vessels, etc., the existing rules must be observed in addition to the general rules.

## 8.4 Temperature limit

At higher media temperatures than specified in the technical documentation, the equipment can only be used if structural measures prevent these temperatures from occurring on the measuring system. In the case of steam measurement, this is achieved by the connection of condensate vessels, in the case of liquids by means of a differential pressure line made of metal (siphon), which must not be insulated, minimum length 500 mm between the shut-off valve and the device. The last version can be used up to 300 ° C.

# 9. Maintenance

The differential pressure gauges are maintenance-free and are characterized by a long service life when properly handled / operated.
If the zero point changes by more than ± 20% of the full scale value after a long period of use, especially during frequent load changes, we recommend a check for safety reasons.

This review of the ad should be done about once or twice a year. To do this, disconnect the device from the process and check it with a pressure test device.

Application-specific variants both in construction and in material selection are possible.

# 10. Technical Information

Operating instructions, data sheet, approvals and further information via the QR code on the device or via www.kobold.com

# 11. Order Codes

Operating instructions, data sheet, approvals and further information via the QR code on the device or via www.kobold.com

# 12. Dimensions

Operating instructions, data sheet, approvals and further information via the QR code on the device or via www.kobold.com

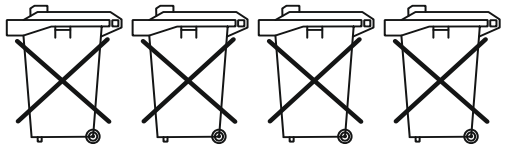
# 13. Disposal

**Note!**

- Avoid environmental damage caused by media-contaminated parts
- Dispose of the device and packaging in an environmentally friendly manner
- Comply with applicable national and international disposal regulations and environmental regulations.

**Batteries**

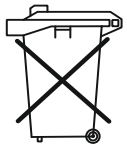
Batteries containing pollutants are marked with a sign consisting of a crossed-out garbage can and the chemical symbol (Cd, Hg, Li or Pb) of the heavy metal that is decisive for the classification as containing pollutants:



Cd[1] Hg[2] Pb[3] Li[4]

1. „Cd" stands for cadmium
2. „Hg" stands for mercury
3. „Pb" stands for lead
4. „Li" stands for lithium

**Electrical and electronic equipment**



# 14. EU Declaration of Conformance

We, KOBOLD Messring GmbH, Hofheim-Ts, Germany, declare under our sole responsibility that the product:

**Differential Pressure Gauges with Bourdon Tube** **Model: MAN-DF...**

to which this declaration relates is in conformity with the following EC guidelines:

**2011/65/EU** **RoHS** (category 9)

Additional for **MAN-..S/M/I/P**:

is in conformity with the standards noted below:

**EN 60947-1:2015** Low-voltage switchgear and controlgear - Part 1: General rules

Also the following EC guidelines are fulfilled:

**2014/35/EU** **Low Voltage Directive**
**2014/30/EU** **EMC Directive**

Hofheim, 28 Jan. 2019

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