Technik für Umweltschutz
AFRISO
Messen. Regeln. Überwachen.

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Operating instructions

probes

DMU 08, DMU 09, DMU 08 T

ID: 900.100.0832 Version: 06.2023.0

1. General and Safety-Related Information on this Operating Manual

This operating manual enables safe and proper handling of the product.
This operating manual forms part of the device and should be kept in close proximity to the place of use, accessible for staff members at any time.

All persons entrusted with the mounting, installation, putting into service, operation, maintenance, removal from service, and disposal of the device must have read and understood the operating manual and in particular the safety-related information.

The following documents are an important part of the operating manual:

- *Data sheet*

For specific data on the individual sensors, please refer to the respective data sheet.

Download these by accessing www.afriso.com or request them by e-mail or phone: info@afriso.com.

In addition, the applicable accident prevention regulations, safety requirements, and country-specific installation standards as well as the accepted engineering standards must be observed.

1.1 Symbols Used

Warning word	- Type and source of danger - Measures to avoid the danger

Warning word	Meaning
DANGER	- Imminent danger! - Non-compliance **will result in** death or serious injury.
WARNING	- Possible danger! - Non-compliance **may result in** death or serious injury.
CAUTION	- Hazardous situation! - Non-compliance **may result in** minor or moderate injury.

NOTE – draws attention to a possibly hazardous situation that may result in property damage in case of non-compliance.

✓ Precondition of an action

1.2 Staff Qualification

Qualified persons are persons that are familiar with the mounting, installation, putting into service, operation, maintenance, removal from service, and disposal of the product, and have the appropriate qualification for their activity.

This includes persons that meet at least one of the following three requirements:

- They know the safety concepts of metrology and automation technology and are familiar therewith as project staff.
- They are operating staff of the measuring and automation systems and have been instructed in the handling of the systems. They are familiar with the operation of the devices and technologies described in this documentation.
- They are commissioning specialists or are employed in the service department, and have completed training that qualifies them for the repair of the system. In addition, they are authorized to put into operation, to ground, and to mark circuits and devices according to the safety engineering standards.

All work with this product must be carried out by qualified persons!

1.3 Intended Use

The **probes** are exclusively suitable for continuous hydrostatic filling-level measurement.

The user must check whether the device is suited for the selected use. In case of doubt, please contact our sales department (info@afriso.com). AFRISO assumes no liability for any wrong selection and the consequences thereof!

The fluids that can be measured are liquids that are compatible with the materials in contact with the fluids, described in the data sheet. For application, it must additionally be ensured that the fluid is compatible with the parts in contact with the fluid.

The specifications listed in the current data sheet are binding and must absolutely be complied with. If you do not have the data sheet to hand, please request it or download it from our homepage. (http://www.afriso.de)

1.4 Limitation of Liability and Warranty

Failure to observe the instructions or technical regulations, improper use and use not as intended, and alteration of or damage to the device will result in the forfeiture of warranty and liability claims.

1.5 Safe Handling

NOTE – Treat the device with care both in the packed and unpacked condition!

NOTE – The device must not be altered or modified in any way.

NOTE – Do not throw or drop the device!

NOTE – Excessive dust accumulation (over 5 mm) and complete coverage with dust must be prevented!

The device is state-of-the-art and is operationally reliable. Residual hazards may originate from the device if it is used or operated improperly.

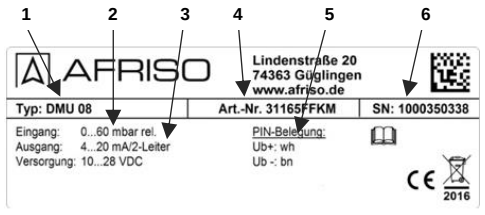
1.6 Packaging Content

Check that all parts listed in the scope of delivery are included free of damage, and have been delivered according to your purchase order:

- probe
- operating manual

2. Product Identification

The device can be identified by means of the type plate with order code. The most important data can be gathered therefrom.



1	Type designation	**4**	Order code
2	Input	**5**	Terminal assignment
3	Output	**6**	Serial number

Fig. 1: Type plate

NOTE – The type plate must not be removed!

3. Mounting

3.1 Mounting and Safety Instructions

WARNING	- airborne parts, leaking fluid, electric shock - Always mount the device in a depressurized and de-energized condition!

NOTE – If there is increased risk of damage to the device by lightning strike or overvoltage, increased lightning protection must additionally be provided!

NOTE – Install the probe such that any rubbing or bumping of the sensor head (sensor element), e.g. against a container wall, is excluded. Observe the operating conditions such as, for example, flow conditions. This applies in particular to probes equipped with cable outlet and to devices with tube extensions of a length over 2.8 m.

NOTE – Do not remove the packaging or protective caps of the device until shortly before the mounting procedure, in order to exclude any damage to the diaphragm and the threads!

Protective caps must be kept! Dispose of the packaging properly!

NOTE – Treat any unprotected diaphragm with utmost care; this can be damaged very easily.

3.2 Mounting Steps for Probes

NOTE – Always immerse the device slowly into the fluid to be measured! If the probe strikes the liquid surface, the diaphragm could be damaged or destroyed.

NOTE – Fasten the probe properly according to your requirements.

NOTE – Free-hanging probes with FEP cables should not be used if effects of highly charging processes can be expected.

As standard, the probe is supplied without fastening material. Clamp fixing, anchor clamp and mounting flanges are available as accessories, for different mounting variants.

3.3 Mounting Steps for fitting set

✓ The mounting thread is clean and undamaged
✓ The O-ring is undamaged and seated in the designated groove

1. Assemble suitable parts according to demands.
2. Conduct the Cable by the PG11 screw connection. Note the submersion depth in the container.
3. Then tighten the single parts of the fitting set by hand.

If you need a fitting set, this can be ordered from AFRISO as an accessory (Art. No. 52125).

3.4 Removal of Protective Cap (if equipped)

The probes are equipped with a plastic protective cap to protect the diaphragm. This has to be pulled off prior to putting into service if the probe is to be used in a higher viscous fluid such as sludge. This makes the probe front-flush, and the fluid reaches the diaphragm.

Removal by hand

1. Hold the probe such that the protective cap points upward.
2. Hold the probe with one hand on the probe section (Fig. 2 – 1).
3. Pull off the protective cap (Fig. 2 – 2) with the other hand.

Removal using a tool (recommended)

1. Hold the probe such that the protective cap points upward.
2. Slide a thin tool (Fig. 2 – 8), e.g. a screwdriver, through two opposite bores of the protective cap (Fig. 2 – 2).
3. Lever off the protective cap.

NOTE – Do not damage the measuring cell (Fig. 2 – 7) under the protective cap!

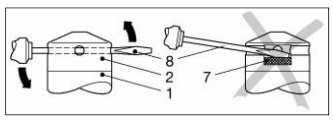


Fig. 2: Removal of protective cap

3.5 Cable Protection (Optional)

According to order, the probe was supplied with cable protection; if the probe was prepared for mounting by means of a stainless steel or PVC tube (optional), the customer must affix a cable protection themselves.

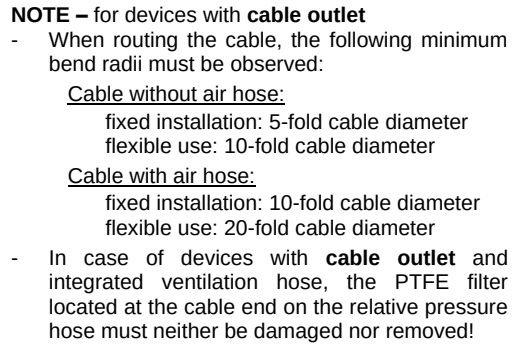


Fig. 3: Cable protection variants

4. Electrical Connection

4.1 Connection and Safety Instructions

WARNING	- Improper installation may result in electric shock - Always mount the device in a depressurized and de-energized condition!
DANGER	- Explosion hazard if the operating voltage is too high (max. 28VDC)! - Operate the device only within the specification! (data sheet)

✓ The limit values listed in the EC type-examination certificate are observed. (Capacity and inductance of the connection cable are not included in the values.)
✓ The supply corresponds to protection class II. (protective insulation)

NOTE – for devices with **cable outlet**

- When routing the cable, the following minimum bend radii must be observed:
  Cable without air hose:
  fixed installation: 5-fold cable diameter
  flexible use: 10-fold cable diameter
  Cable with air hose:
  fixed installation: 10-fold cable diameter
  flexible use: 20-fold cable diameter
- In case of devices with **cable outlet** and integrated ventilation hose, the PTFE filter located at the cable end on the relative pressure hose must neither be damaged nor removed!

NOTE – Use a shielded and twisted multicore cable for the electrical connection.

NOTE – If a transition is desired from a cable with relative pressure hose to a cable without relative pressure hose, we recommend using the terminal box with pressure equalizing port (Art. No. 31824).

4.2 Electrical Installation

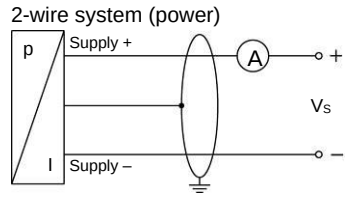
Connect the device electrically according to the information specified on the type plate, the following table, and the connection circuit diagram.

Terminal assignment table:

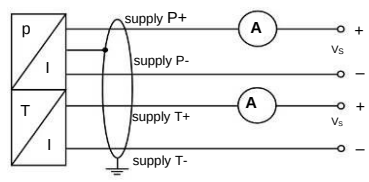
Electrical connections	Cable colors (IEC 60757)
Supply + Supply –	wh (white) bn (brown)
Shield	gnye (green-yellow)
DMU 08 T	**Cable colors (IEC 60757)**
Supply P+ Supply P– Supply T+ Supply T–	wh (white) bn (brown) gy (gray) pk (pink)
Shield	gnye (green-yellow)

Connection circuit diagrams:

2-wire system (power)



2x2-wire-system (current) (DMU 08 T)



NOTE – In the case of relative pressure gauges, the cable contains a ventilation hose for pressure equalization. Route the end of the cable into an area or suitable connection box which is as dry as possible and free from aggressive gases, in order to prevent any damage

NOTE – Normally, the required cable is included in the scope of delivery. If existing or special cables need to be integrated, this will increase the total resistance. For applications where the additional line resistance turns out to be interfering, the designated cable must be checked by means of the following calculation:

$$R_L = \frac{\rho \cdot 2 \cdot l}{A}$$

With R_L: resistance of connection line in Ω
ρ: spec. resistance in Ω mm²/m
l: conductor length in m
A: conductor cross-section in mm²

$$U_{Ges} = (R_{L1} + R_{L2} + ... + R_{Bürde}) \cdot 0{,}02\ A$$

with U_{Ges}: total voltage drop
$R_{Bürde}$: load resistance (this can be gathered from the current data sheet)

The following condition must be met:

$$U_B > U_{Ges} + U_{Bmin}$$

with V_S: designated supply voltage
V_{Smin}: minimum supply voltage (this can be gathered from the current data sheet)

4.3 Separable Probes

To simplify storage and maintenance, the probe head can be separated from the cable part and replaced without laborious assembly work, if needed. The following probes are separable.

Disassembly

1. Hold the probe with one hand at the probe section (2) and cautiously turn the sleeve nut (4) counterclockwise with the other hand. When doing so, note that the cable part (3) must not be distorted against the housing!
2. Hold the probe part (2) straight when unscrewing it from the cable part (3), and after loosening, pull off the probe part in a straight motion so that the plug connection is not damaged.

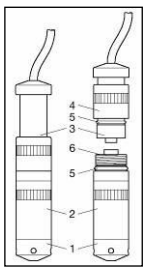


Fig. 7: Separability

Assembly

- ✓ O-rings are not damaged (5, 6) or damaged O-rings have been replaced
- ✓ Radial O-rings (5) have been greased with petroleum jelly or O-ring grease
- ✓ Any grease residues have been removed from the axial O-ring (6).

1. Insert the cable part (3) into the mating connector of the probe section (2) in a straight motion.
2. Hold the probe with one hand at the probe section (2) and screw on the sleeve nut (4) tightly with the other hand. When doing so, note that the cable part (3) must not be distorted against the housing!

Pin assignment

Electrical connections	Binder series 723 (5-pin)	Binder series 723 (7-pin)
Supply +	3	3
Supply -	1	1
Shield	5	2

5. Commissioning

- ✓ The device has been installed properly
- ✓ The device does not have any visible defect

6. Maintenance

DANGER	- Airborne parts, leaking fluids, electric shock - Always service the device in a depressurized and de-energized condition!
Attention	- due to aggressive fluids - Wear suitable protective clothing, e.g. gloves, safety goggles.

In principle, the device requires no maintenance.
If necessary, clean the housing of the device using a moist cloth and a non-aggressive cleaning solution.

Cleaning of the diaphragm:
Deposits or contamination may occur on the diaphragm in case of certain fluids. It is recommended to establish appropriate maintenance intervals for checking purposes.

Clean the diaphragm cautiously using a non-aggressive cleaning solution and a soft paintbrush or sponge.
If the diaphragm is calcified, it is recommended to have the decalcification performed by AFRISO. Please note the chapter “Service/Repair” with regard to this.

NOTE – Wrong cleaning may damage the measuring cell beyond repair. Do not use any sharp or pointed item, or compressed air to clean the diaphragm.

7. Troubleshooting

CAUTION	- Airborne parts, leaking fluids, electric shock - If malfunctions cannot be resolved, put the device out of service and proceed according to sections 8 and 10!

In case of malfunction, it must be checked whether the device has been correctly installed mechanically and electrically. Use the following table to analyze the cause and resolve the malfunction, if possible.

Fault: no output signal	
Possible cause	**Fault detection / remedy**
connected incorrectly	Checking of connections
Conductor/wire breakage	Checking of all line connections.
Defective measuring device (signal input)	Checking of ammeter (miniature fuse) or of analog input of your signal processing unit

Fault: analog output signal too low/small	
Possible cause	**Fault detection / remedy**
Load resistance too high	Checking of load resistance (value)
Supply voltage too low	Checking of power pack output voltage
Defective energy supply	Checking of the power pack and the supply voltage being applied to the device

Fault: slight shift of the output signal	
Possible cause	**Fault detection / remedy**
Diaphragm of measuring cell is severely contaminated	Cleaning using a non-aggressive cleaning solution and soft paintbrush or sponge
Diaphragm of measuring cell is calcified or crusted	**Recommendation:** Have the decalcification or cleaning performed by AFRISO

Fault: large shift of the output signal	
Possible cause	**Fault detection / remedy**
Diaphragm of measuring cell is damaged (caused by overpressure or mechanically)	Checking of diaphragm; when damaged, send the device to AFRISO for repair

Fault: wrong or no output signal	
Possible cause	**Fault detection / remedy**
Cable damaged mechanically, thermally or chemically	Checking of cable; pitting corrosion on the stainless-steel housing as a result of damage on cable; when damaged, send the device to AFRISO for repair

8. Removal from Service

DANGER	- Airborne parts, leaking fluids, electric shock - Always dismount the device in a depressurized and de-energized condition!
Attention	- due to aggressive fluids. - Wear suitable protective clothing, e.g. gloves, safety goggles.

NOTE – After dismounting, mechanical connections must be fitted with protective caps.

9. Service/Repair

Information on service / repair:

- www.afriso.com
- info@afriso.com
- service@afriso.de

9.1 Recalibration

The offset value or range value may shift during the life of the device. In this case, a deviating signal value in relation to the set lower or upper measuring range value is output. If one of these two phenomena occurs after extended use, a recalibration in the factory is recommended. Please note the chapter “Service/Repair” with regard to this.

9.2 Returning the device

Get in touch with us before returning your product (service@afriso.de).
A declaration of decontamination must be enclosed with the device for every return, regardless of whether it is for recalibration, decalcification, conversion or repair. Corresponding templates can be found on our homepage.
Devices without a declaration of decontamination will only be examined after receipt of a cor-responding declaration in case of doubt regarding the medium used!

10. Decommissioning, diposall

Dispose of the product in compliance with all applicable directives, standards and safety Regulations.

	1. Disconnect the product from mains. 2. Dismount the product (see chapter "Mounting", reverse sequence of steps). 3. Dispose of the product.

11. Warranty

See our terms and conditions at www.afriso.com or your purchase contract for information on warranty.

12. EU Declaration of Conformity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EU - Konformitätserklärung
EU Declaration of Conformity / Déclaration EU de conformité / Declaración de conformidad CE / Declaração de conformidade CE / Deklaracja zgodności UE

CE

Formblatt FB 27 - 03

Name und Anschrift des Herstellers: AFRISO-EURO-INDEX GmbH, Lindenstraße 20, 74363 Güglingen
Manufacturer / Fabricant / Fabricante / Nome e endereço do fabricante / Producent:

Erzeugnis: Druckmessumformer
Product / Produit / Producto / Produto / Produkt:

Typenbezeichnung: DMU 01, DMU 03, DMU 04, DMU 05, DMU 06, DMU 08 T
Type / Type / Tipo / Tipo / Typ:

Betriebsdaten: 4 – 20 mA
Techn. Details / Caractéristiques / Características / Detalhes técnicos / Dane techniczne:

Wir erklären in alleiniger Verantwortung, dass das bezeichnete Erzeugnis mit den Vorschriften folgender Europäischer Richtlinien übereinstimmt:
We declare under our sole responsibility that the above mentioned product meets the requirements of the following European Directives:
Le produit mentionné est conforme aux prescriptions des Directives Européennes suivantes:
El producto indicado cumple con las prescripciones de las Directivas Europeas siguientes:
O produto indicado cumpre com as prescrições das seguintes Diretivas Europeias:
Wymieniony wyżej produkt spełnia wymagania następujących Dyrektyw Europejskich:

Elektromagnetische Verträglichkeit (2014/30/EU)
Directive Electromagnetic Compatibility / Directive compatibilité électromagnétique / Directiva compatibilidad electromagnética / Direttiva sobre compatibilità elettromagnetica / Dyrektywa kompatybilności elektromagnetycznej
EN 61326-1:2013

Druckgeräterichtlinie (2014/68/EU)
Pressure Equipment Directive / Directive équipements sous pression / Direttiva equipaggi a pressione / Dyrektywa ciśnieniowa
Modul A
Die Anwendung dieser Richtlinie bezieht sich nur auf Geräte mit maximal zulässigem Überdruck > 200 bar

RoHS-Richtlinie (2011/65/EU)
RoHS Directive / Directive RoHS / Direttiva RoHS / Direktywa RoHS
EN IEC 63000:2018

Unterzeichner: Dr. Späth, Geschäftsführer Technik
Signed / Signataire / Firmante / Assinado por / Podpisał: Technical Director / Direttore Tecnico / Dyrektor Techniczny

9. Mai 2023
Datum / Date / Fecha / Data

Unterschrift / Signature / Firma / Assinatura / Podpis

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EU Declaration of Conformity / Déclaration EU de conformité / Declaración de conformidad CE / Declaração de conformidade CE / Deklaracja zgodności UE

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Erzeugnis: Druckmessumformer
Product / Produit / Producto / Produto / Produkt:

Typenbezeichnung: DMU 07, DMU 09
Type / Type / Tipo / Tipo / Typ:

Betriebsdaten: 4 – 20 mA
Techn. Details / Caractéristiques / Características / Detalhes técnicos / Dane techniczne:

Wir erklären in alleiniger Verantwortung, dass das bezeichnete Erzeugnis mit den Vorschriften folgender Europäischer Richtlinien übereinstimmt:
We declare under our sole responsibility that the above mentioned product meets the requirements of the following European Directives:
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Directive Electromagnetic Compatibility / Directive compatibilité électromagnétique / Directiva compatibilidad electromagnética / Direttiva sobre compatibilità elettromagnetica / Dyrektywa kompatybilności elektromagnetycznej
EN 61326-1:2013

RoHS-Richtlinie (2011/65/EU)
RoHS Directive / Directive RoHS / Direttiva RoHS / Direktywa RoHS
EN IEC 63000:2018

Unterzeichner: Dr. Späth, Geschäftsführer Technik
Signed / Signataire / Firmante / Assinado por / Podpisał: Technical Director / Direttore Tecnico / Dyrektor Techniczny

1. Oktober 2021
Datum / Date / Fecha / Data

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