AFRISO
Technik für Umweltschutz
Messen. Regeln. Überwachen.

Lindenstraße 20
74363 Güglingen
Fon: +49 7135 102-0
Service: +49 7135 102-211
info@afriso.com
www.afriso.com

Translation of the Original Operating Manual Part 1/2

Pressure transmitters / screw-in probes

DMU 14 FG EX :
Ex II 1G Ex ia IIC T4 Ga und Ex II 1D Ex ia IIIC T85°C Da

DMU 14 DG EX:
Ex II 2G Ex ia IIC T4 Gb und Ex II 1D Ex ia IIIC T85°C Da

CE 0123

Ex

HART COMMUNICATION FOUNDATION

READ THOROUGHLY BEFORE USING THE DEVICE
KEEP FOR FUTURE REFERENCE
ID: 900.100.0827 | Version: 03.2022.0

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

This operating manual enables safe and proper handling of the product, and forms part of the device. It 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*
- *Type-examination certificate*
- Supplementary sheet on operation page 2/2 (900.100.0827)

Download these by accessing www.afriso.com or request them by e-mail or phone: info@afriso.com | Fon: +49 7135 102-211

The explosion-proof versions of our products are variants of the standard products.

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

For the installation, maintenance and cleaning of the device, the relevant regulations and provisions on explosion protection (VDE0160, VDE 0165 and/or EN 600079-14) as well as the accident prevention regulations must absolutely be observed. The device was designed by applying the following standards:

EN 60079-0:2012+A11:2013
EN 60079-11-2012

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 devices are used to convert the physical parameter of pressure into an electric signal.

The **pressure transmitters** are exclusively suited for measuring positive, negative and absolute pressures.

A device has an explosion-protection approval if this was specified in the purchase order and confirmed in our order acknowledgement. In addition, the type plate includes a ⟨Ex⟩ sign.

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 | Fon: +49 7135 102-211).

AFRISO assumes no liability for any wrong selection and the consequences thereof!

The fluids that can be measured are gases and 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.

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 Safety-Related Maximum Values

DMU 14 FG EX, DMU 14 DG EX

Range of ambient temperature:
Use in zone 0 (p_{atm} 0.8 bar to 1.1 bar): -20 ... 60 °C
Use in zone 1 and 2: -25 ... 70 °C
Supply and signal circuit:
U_i = 28 V, I_i = 98 mA, P_i = 680 mW, $C_i \approx 0$ nF, $L_i \approx 0$ µH
plus Line inductance 1 µH/m and line capacity 160 pF/m (with factory cable)
With respect to the housing, the supply connections have an interior capacity of max. 27 nF

NOTE – The limit values only apply for devices with intrinsically safe circuits

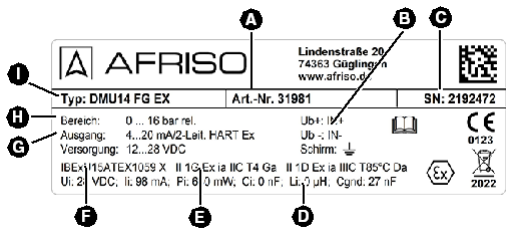
1.7 Scope of Delivery

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

- Pressure transmitter, protective cap
- for mech. connections to DIN 3852: O-ring (premounted)
- Operating Manual, supplementary sheet / Menu system structure

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.



A. Order code
B. Terminal assignment
C. Serial number
D. Safety-Related Maximum Values
E. IS marking
F. EC-type examination certificate
G. Output
H. Input
I. Type designation

Fig. 1: Type plate

NOTE – The type plate must not be removed!

The marking for devices with explosion-protection approval must include the following information:

EG Type-examination certificate **IBExU15ATEX1059 X**

Marking:
DMU 14 FG EX :
Ex II 1G Ex ia IIC T4 Ga and **Ex II 1D Ex ia IIIC T85°C Da**

DMU 14 DG EX:
Ex II 2G Ex ia IIC T4 Gb and **Ex II 1D Ex ia IIIC T85°C Da**

3. Mounting

3.1 Mounting and Safety Instructions

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

NOTE – ThetechnicaldatalistedintheECtype-examination certificate are binding. Download these by accessing www.bdsensors.de or request them by e-mail or phone: info@afriso.com Fon: +49 7135 102-211

NOTE – Make sure that the entire interconnection of intrinsically safe components remains intrinsically safe. The owner-operator is responsible for the intrinsic safety of the overall system (entire circuitry).

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

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

NOTES – for mounting outdoors or in a moist environment:

- Connect the device electrically straightaway after mounting or prevent moisture penetration, e.g. by a suitable protective cap. (The protection rating specified on the data sheet applies to the connected device.)
- Select the mounting position such that splashed and condensed water can drain off. Stationary liquid on sealing surfaces must be excluded!
- If the device has a cable outlet, the outgoing cable must be routed downwards. If the cable needs to be routed upwards, this must be done in an initially downward curve.
- Mount the device such that it is protected from direct solar radiation. In the most unfavorable case, direct solar radiation leads to the exceeding of the permissible operating temperature. This must be excluded if the device is used in any explosion-hazardous area!
- A device with gauge reference in the housing (small hole next to the electrical connection) must be mounted such that the gauge reference is protected against dirt and humidity. If the transducer is exposed to liquid admission, the gauge reference will be blocked, and the equalization of air pressure will be prevented. In this condition, a precise measurement is impossible and damage to the transducer may occur.
- Provide for a cooling section if the device is used in a steam line.

NOTE – When installing the device, avoid high mechanical stresses on the pressure port! This will result in a shift of the characteristic curve or to damage, in particular in case of very small pressure ranges and devices with a pressure connection/port made of plastic.

NOTE – In hydraulic systems, arrange the device such that the pressure port points upwards. (venting)

NOTE – If the device is installed with the pressure port pointing upwards, ensure that no liquid drains off on the device. This could result in humidity and dirt blocking the gauge reference in the housing, and could lead to malfunctions. If necessary, dust and dirt must be removed from the edge of the screwed joint of the electrical connection.

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 – The specified tightening torques must not be exceeded!

3.2 Mounting Steps for Connections According to DIN 3852

NOTE – Do not use any additional sealing material such as tow, hemp or Teflon tape!

✓ The O-ring is undamaged and seated in the designated groove.

✓ The sealing face of the mating component has a flawless surface. (R_z 6.3)

1 Screw the device into the mating thread by hand.
2 Devices equipped with a knurled ring: only tighten by hand
3 Devices with a wrench flat must be tightened using a suitable open-end wrench.
- Wrench flat made of steel: G1/2: approx. 10 Nm; G1: approx. 20 Nm; G1 1/2: approx. 25 Nm;
- Wrench flat made of plastic: max. 3 Nm)

3.3 Mounting Steps for Connections According to EN 837

✓ A suitable seal for the measured fluid and the pressure to be measured is available. (e.g. a copper seal)

✓ The sealing face of the mating component has a flawless surface. (RZ 6.3)

1 Screw the device into the mating thread by hand.
2 Then tighten it using an open-end wrench:
Process connection made of steel:
G1/2: approx. 50 Nm

3.4 Mounting Steps for NPT Connections

✓ Suitable fluid-compatible sealing material, e.g. PTFE tape, is available.

1 Screw the device into the mating thread by hand
2 Then tighten it using an open-end wrench: 1/2" NPT: approx. 70 Nm

3.5 Mounting Steps for G1“ cone connection

1 Screw the device into the mating thread by hand (seal produced metallically)
2 Then tighten it using an open-end wrench: PN < 10 bar: 30 Nm; PN ≥ 10 bar: 60 Nm

3.6 Mounting Steps for Milk Pipe Connections

✓ The O-ring is undamaged and seated in the designated groove.

1 Center the milk pipe connection in the corresponding mating fitting.
2 Screw the sleeve nut onto the mating fitting.
3 Then tighten it using a hook wrench.

3.7 Mounting Steps for Clamp and Varivent® Connections

✓ A suitable seal for the measured fluid and the pressure to be measured is available.

1 Place the seal onto the corresponding mating fitting
2 Center the clamp connection or Varivent® connection above the corresponding mating fitting
3 Then fasten the device using a suitable fastener (e.g. half-ring or retractable ring clamp connection) according to the instructions specified by the manufacturer

3.8 Mounting Steps for DRD and Flange Connections

✓ A suitable seal for the measured fluid and the pressure to be measured is available. (e.g. a fiber seal)

1 Position the seal between the connecting flange and the mating flange
2 Then attach the device to the mating flange using 4 or 8 bolts/nuts (depending on flange design)

3.9 Orientation of the Display and Operating Module (optional)

DANGER	- By opening the housing where an explosion hazard exists - Do not open the housing while an explosion hazard exists!

The display and operating module can be rotated continuously so as to guarantee easy readability even in unusual mounting positions. Proceed as follows to change the position:

- Unscrew the housing cover by hand.
- Rotate the display and operating module carefully by hand into the desired position. The module is equipped with a turning limiter.
- Before the cover is screwed on again, the O-ring and sealing surface on the housing must be checked for damage and, if necessary, replaced!
- Then screw on the cover by hand and make sure that the housing is tightly closed again.

NOTE – Ensure that moisture cannot enter the device! The seals and sealing surfaces must not get dirty, as (depending on application and location) fouling can cause a reduced degree of protection and therefore lead to device failure or irreparable damage to the device.

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)
DANGER	- by opening the field housing where an explosion hazard exists - Do not open the field housing while an explosion hazard exists!

✓ 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 connection terminals, the connection must be made such that the isolation distances according to standard are observed and that loosening of the connecting lines is impossible.

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

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 – The cover for the connection terminals and display can only be opened if a safety lock, grub screw with hexagon socket, has been removed. The screw is located on the right-hand side below the cover. After affixing the cover for the display and connection terminals, the safety lock must be screwed in again. Greasing of the threads is not necessary for this.

NOTE – In order to electrically connect the device with connection terminals, the cover must be screwed off. If the device has a display and operating module, this should be pulled out carefully. During installation, place it next to the housing such that the wires are not under stress. Afterwards, insert it again carefully and ensure that the connection wires are not twisted or pinched. Before the cover is screwed on again, the O-ring and sealing surface on the housing must be checked for damage and, if necessary, replaced! Then screw on the cover by hand and make sure that the field housing is tightly closed again.

NOTE – The cable entry on devices with pressure-resistant casing is only suitable for permanent installation!

4.2 Conditions for the Explosion-Hazardous Area

Danger generated by electrostatic charging

DANGER	- Explosion hazard due to spark formation from electrostatic charging of plastic components. - If devices are equipped with a cable outlet, the connection cable routing must be fixed. - Do not clean the device and, if applicable, the connection cable, in a dry state! Use a moist cloth, for example.

The following warning sign is affixed on devices with plastic components.

Fig. 2: Warning sign

NOTE – The warning sign must not be removed from the device!

Overvoltage protection

If the pressure transmitter is used as a Category 1 G piece of equipment, a suitable overvoltage protector must be installed upstream (refer to the German Ordinance on Industrial Health [BetrSichV] and EN60079-14).

Schematic circuit design

The operation of an intrinsically safe device in the explosion-hazardous area requires special care when selecting the required Zener barrier or transmitter repeater devices in order to utilize the device properties to the full extent. The following diagram shows a typical arrangement consisting of power pack, Zener barrier and pressure transmitter.

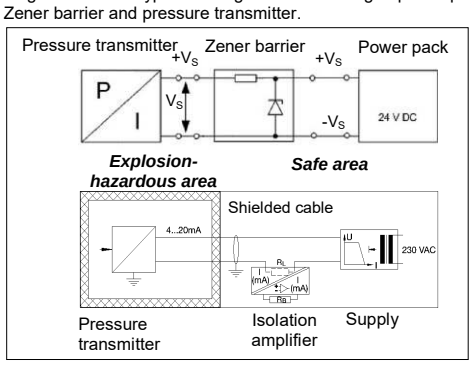


Fig. 3: Wiring diagrams

NOTE – Observe item (17) of the type-examination certificate! (special conditions for intrinsically safe operation)

Exemplary circuit description

The supply voltage of e.g. 24 V_{DC} provided by the power pack is led through the Zener barrier. The Zener barrier contains series resistors and Zener diodes as protective components. The operating voltage is applied to the device by the Zener barrier and, depending on the pressure, a particular signal current will flow.

DANGER	- Danger to life - Operation of intrinsically safe devices as zone-0 equipment only with ungrounded and galvanically isolated power supply

Selection criteria for Zener barriers and power supplies

The minimum supply voltage $U_{B\,min}$ of the device must not be undercut; the minimum supply voltage is defined in the product-specific data sheet under “Output signal / auxiliary energy”.

When using a galvanically isolated power supply with linear limitation, it must be taken into account that the terminal voltage of the device will decrease because of the linear limitation, as with a Zener barrier. Furthermore, account must be taken of the fact that a certain voltage drop will also occur on an optionally used signal isolation amplifier, whereby the operating voltage of the pressure transmitter will decrease additionally.

Test criteria for the selection of the Zener barrier

In order not to undercut $U_{B\,min}$ it is important to check which minimum supply voltage is available at full-level modulation of the device. The full-level modulation, that is, a maximum and nominal output signal (20 mA), is achieved by applying the maximum physical input signal (pressure).

Usually the specifications of the Zener barrier will provide an answer as to the selection of the barrier. However, the value can also be determined by calculation. If a maximum signal current of 0.02 A is assumed, a certain voltage drop on the series resistor of the Zener barrier follows in accordance with Ohm’s law. This voltage drop must be subtracted from the voltage of the power pack, in order to reach the terminal voltage applied to the device in the full-level modulation state. If this voltage is less than the minimum supply voltage, either another barrier or a higher supply voltage must be selected.

NOTE – When selecting the barrier or power supply, you must look out for any ballasts which are not suitable for HART® communication. Most manufacturers offer a device group specially developed for this application.

NOTE – When selecting the ballasts, the maximum operating conditions according to the type-examination certificate must be observed. When assessing the ballasts, refer to their current data sheets to ensure that the entire interconnection of intrinsically safe components will remain intrinsically safe.

Calculation example for the selection of the Zener barrier

The nominal voltage of the power pack (supply) upstream of the Zener barrier is 24 $V_{DC} \pm 5$ %.
From this follows:

- maximum supply voltage:
  $U_{Sup\,max}$ = 24 V * 1.05 = 25.2 V
- minimum supply voltage:
  $U_{Sup\,min}$ = 24 V * 0.95 = 22.8 V

The series resistor of the Zener barrier is specified with 295 Ohms. The following values remain to be calculated:

- Voltage drop at the barrier (at full-level modulation):
  $U_{ab\,barrier}$ = 295 Ω * 0.02 A = 5.9 V
- Terminal voltage of the device with Zener barrier:
  $U_{KI} = U_{Sup\,min} - U_{ab\,barrier}$ = 22.8 V – 5.9 V = 16.9 V
- Minimum supply voltage of the device, e.g. LMK 351 (as per data sheet):
  $U_{KI\,min}$ = 12 V_{DC} (corresponds to $U_{B\,min}$)

Condition:

$U_{KI} \geq U_{KI\,min}$

Result:

The terminal voltage of the device with Zener barrier amounts to 16.9 V and is thus higher than the device’s minimum supply voltage which is 12 V_{DC}. This means that the Zener barrier was correctly selected with respect to the supply voltage.

NOTE – Please note that no line resistances have been listed in this calculation. These lead additionally to a voltage drop that must be taken into account.

4.3 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	Field housing	Cable colors (IEC 60757)
Supply + Supply –	IN + IN -	wh (white) bn (brown)
Shield	⏚	gnye (green-yellow)

[1] By connecting an ammeter between Supply + and Test, the output signal can be checked without disconnecting the supply volltage

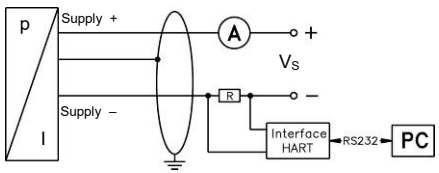


Fig. 5 Connection circuit diagram 2-wire system (power) HART®

NOTE – For unambiguous identification, the intrinsically safe cable is marked with a light blue shrinkable tube (around the cable insulation). If a modification (e.g. a shortening) of the cable is inevitable whereby the marking at the end of the cable is lost, the marking must be restored! (Renewed marking by a light blue shrinkable tube or by an appropriate marking label)

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.

5. HART® communication

DANGER	- Risk of explosion when interrupting the intrinsically safe circuit where an explosion hazard exists - Only interrupt the intrinsically safe circuit for looping-in a HART® communication interface (HART® Communicator or HART® Modem) when no explosion hazard is present.

An additional signal as per HART® specification is superimposed on the analog output signal. The device may be configured by means of a HART® communication device. In this regard, we recommend the CIS 150 programming kit (available as accessory).

In order to ensure trouble-free operation, the following requirements must be taken into account:

Maximum cable length between measuring device and supply:

$$L_{max} = \frac{65 \cdot 10^6}{R_V \cdot C_V} - \frac{40 \cdot 10^3}{C_V}$$

Wherein
L_{max}: maximum length of cable in [m]
R_V: resistance of cable together with load resistance in [Ω]
C_V: capacity of cable in [pF/m]

Resistance R:

$$R = \frac{U - 12}{0{,}024}\ \Omega$$

wherein U: supply in [V_{DC}]

The resistance must be at least 240 Ω.

6. Commissioning

- ✓ The device has been installed properly
- ✓ The device does not have any visible defect
- ✓ The device is operated within the specification. (see data sheet and EC type-examination certificate)

7. Operation

Supplementary sheet on operation part 2/2 (900.100.0827)

8. 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.

9. 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!
DANGER	- Explosion hazard - As a matter of principle, work on energized parts, except for intrinsically safe circuits, is prohibited while there is an explosion hazard.

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: Display does not work	
Possible cause	**Fault detection / remedy**
connected incorrectly	Checking of connections
Conductor/wire breakage	Checking of all line connections.
Defective energy supply	check the power pack and the supply voltage present at the transducer

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: Measured value (display and analog output) deviates from the target value	
Possible cause	**Fault detection / remedy**
Over-pressure / pressure surges	recalibration or replacement of the pressure connection by AFRISO is required
mech. damage to the diaphragm	

Fault: constant output signal at 4 mA	
Possible cause	**Fault detection / remedy**
wrong ID number	make sure that the set value under menu item “ID” is “0000”

10. 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.

11. Service/Repair

Information on service / repair:

- www.afriso.com
- info@afriso.com
- Service phone: +49 7135 102-211

11.1 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.

11.2 Return

WARNING	- due to pollutants - Wear suitable protective clothing, e.g. gloves, safety goggles

For every return shipment, whether for recalibration, decalcification, alteration or repair, the device must be cleaned thoroughly and packed in a break-proof manner. A return declaration with a detailed fault description must be added to the defective device. If your device has come into contact with pollutants, a declaration of decontamination is additionally required. . Appropriate templates can be found on our homepage. Download these by accessing www.bdsensors.de or request them by e-mail or phone:
info@afriso.com | Tel: +49 7135 102-211

In case of doubt regarding the fluid used, devices without a declaration of decontamination will only be examined after receipt of an appropriate declaration.

12. Disposal

WARNING	- due to pollutants - Wear suitable protective clothing, e.g. gloves, safety goggles

The device must be disposed of according to the European Directive 2012/19/EU (waste electrical and electronic equipment). Waste equipment must not be disposed of in household waste!

NOTE – Dispose of the device properly!

13. Warranty terms

The warranty terms are subject to the legal warranty period of 24 months, valid from the date of delivery. If the device is used improperly, modified or damaged, we will rule out any warranty claim. A damaged diaphragm will not be accepted as a warranty case. Likewise, there shall be no entitlement to services or parts provided under warranty if the defects have arisen due to normal wear and tear.

14. EU Declaration of Conformity / CE

AFRISO
Technik für Umweltschutz
Messen. Regeln. Überwachen.

EU – Konformitätserklärung
EU-Declaration of Conformity / Déclaration EU de conformité / Declaración de conformidad CE / Declaração de conformidade CE

Formblatt FB 27 - 03

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

Erzeugnis: Druckmessumformer
Product / Produit / Producto / Produto

Typenbezeichnung: DMU 14 xG Ex
Type / Type / Tipo / Tipo:

Betriebsdaten: 12 ... 28 VDC, max 25 mA
Techn. Details:
Caractéristiques / Características / Detalhes técnicos:

Das bezeichnete Erzeugnis stimmt mit den Vorschriften folgender Europäischer Richtlinien überein:
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:

Elektromagnetische Verträglichkeit (2014/30/EU)
Directive Electromagnetic Compatibility / Directive compatibilité électromagnétique / Directiva compatibilidad electromagnética / Diretiva sobre compatibilidade eletromagnética
- EN 61326:2013

Explosionsschutz- Richtlinie (2014/34/EU)
ATEX Directive / Directive ATEX / Directiva ATEX / Diretiva ATEX
- EN 60079-0:2012+A11:2013, EN 60079-11:2012
- EG-Baumusterbescheinigung-Nr.: IBExU15ATEX1059 X
- Benannte Stelle: IBExU Institut für Sicherheitstechnik GmbH, 09599 Freiberg, KennNr: 0637

RoHS-Richtlinie (2011/65/EU)
RoHS Directive / Directive RoHS / Directiva RoHS / Diretiva RoHS

Unterzeichner: Dr. Späth, Geschäftsführer Technik
Signed / Signataire / Firmante / Assinado por: Technical Director / Diretor Técnico

19.10.2020
Datum / Date / Fecha / Data

Unterschrift / Signature / Firma / Assinatura

Version: 3 / Index: 0 | AFRISO-EURO-INDEX GmbH | D-74363 Güglingen | Seite: 1 von 1

Technik für Umweltschutz
Messen. Regeln. Überwachen.

Lindenstraße 20
74363 Güglingen
Fon: +49 7135 102-0
Service: +49 7135 102-211
info@afriso.com
www.afriso.com

Supplementary sheet part 2/2 to operating manual for

DMU 14...EX

Only use in conjunction with the Operating Manual BA_DMU 14...EX part 1/2
ID: 900.100.0827 | Version 03.2022.0

Operation

Display and operating module

DANGER	- Explosion hazard when device is opened in an explosive atmosphere - Do not open or configure the device while an explosion hazard exists!

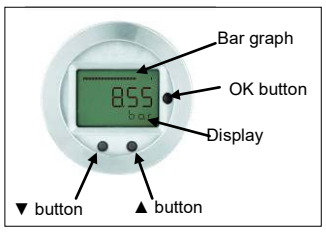


Fig. 4: Control panel

A bar graph is shown in the display, which indicates the applied pressure as a percentage of the measuring range. The display of the measured value and the configuration of the individual parameters is performed through the menu, via the display. The individual functions can be set by means of three buttons arranged under the cover. On XMP-series devices with die-cast aluminum housing, the buttons can be accessed from above. To do this, slide the metal plate (upper side of device) backwards after releasing the right screw.
The three buttons are assigned from the left: ▼, OK, ▲.

The menu system is self-contained. You can scroll through the individual settings menus both forwards and backwards. All settings are permanently stored in a Flash-EPROM and are therefore available even after a disconnection from the supply voltage.

During configuration, ensure that moisture cannot enter the device. Fouling of the seals and sealing surfaces can lead to a reduced degree of protection and therefore to device failure or irreparable damage. The housing cover must be immediately screwed back on by hand following configuration.

Menu list

See supplementary sheet (Supplementary sheet / Menu system structure).

- **▲ button:** with this button you can move forwards in the menu system or increase the indicated value; additionally, the control (operator) mode (starting with menu item 1) can be accessed by pressing the button.
- **▼ button:** with this button you can move backwards in the menu system or reduce the indicated value; additionally, the control (operator) mode (starting with menu item 5) can be accessed by pressing the button.
- **OK button:** this button is for confirming the menu items and the set values

Configuration procedure:

- Select the desired menu item using the ▲ or ▼ button
- Activate the selected menu item by pressing the OK button
- Set the desired value or select a default value by pressing the ▲ or ▼ button
- Store or acknowledge an adjusted or default value and exit a menu item by pressing the OK button

If a parameter can be configured by means of a numerical value, each position can be edited individually. This means that, after activating a menu item of this type (e.g. “2.3.1 OFFSET”) by pressing the OK button, the first digit of the currently set value begins to flash. Now set the desired digit with the ▼ or ▲ button and confirm with the OK button. The following digit will then begin to flash, and can be set as described. In menus “2.3.1 OFFSET” and “2.3.2 FINALVAL”, the decimal point then begins to flash, and you can change its position with the ▼ or ▲ button. Confirm the position with the OK button; the whole value is then saved, assuming it is a permitted value. If not, an error message will appear in the display (e.g. Error 03) and the value is not saved.

If you want to set a negative value, you must configure the first digit with the ▼ button.

1 DIPLAY	**Display parameter**
1.1 P_{max}	**Maximum pressure display (high pressure)** The maximum pressure that occurred during the measurement is shown on the display.
1.2 P_{min}	**Minimum pressure display (low pressure)** The minimum pressure that occurred during the measurement is shown on the display.
1.3 T_{max}	**Maximum temperature display (high temperature)** The maximum temperature that occurred during the measurement is shown on the display.
1.4 T_{min}	**Minimum temperature display (low temperature)** The minimum temperature that occurred during the measurement is shown on the display.
1.5 CLEAR	Delete the values 1.1-1.4 (P_{max}, P_{min}, T_{max}, T_{min})
1.6 INFO	**Configuration of the display** Assignment of the settable digits "1": 1st line: measured pressure — 2nd set pressure unit "2": 1st line: Output signal — 2nd line: mA "3": 1st line: measured temperature — 2nd line: °C "4": 1st line: measured pressure — 2nd line: Change between pressure unit / output signal in mA "5": 1st line: measured pressure — 2nd line: Change between pressure unit / temperature in °C" "6": 1st line: measured pressure — 2nd line: Change between pressure unit / output signal in mA / temperature in °C
2 CALIB	**Configuration of measuring range, display and output signal**
2.1 ZERO	**Zeroing the display** The message “CONFIRM” appears on the display when selecting the subsidiary menu item with the OK button. By holding the OK button pressed for at least 2 seconds the zeroing is performed, and the message “CONFIRM” disappears from the display.
2.2 CAL REF	**Adjusts the analogue output with pressure reference**
2.2.1 OFFSET	**Adjusts the starting value for the output signal** After the reference pressure has been applied and accepted, selecting the subsidiary menu item with the OK button causes the message "CONFIRM" to appear on the display. By holding the OK button pressed for at least 2 seconds the applied pressure is specified as the starting value for the output signal (4 mA), and the message "CONFIRM" disappears from the display. The displayed value remains unchanged.
2.2.2 FINALVAL	**Adjusts the end value for the output signal** After the reference pressure has been applied and accepted, selecting the subsidiary menu item with the OK button causes the message "CONFIRM" to appear on the display. By holding the OK button pressed for at least 2 seconds the applied pressure is specified as the end value for the output signal (20 mA), and the message "CONFIRM" disappears from the display. The displayed value remains unchanged.
2.3 ADJUST	**Sets the measuring range and the zero point**
2.3.1 OFFSET	**Sets the starting value of the measuring range** The ▲ and ▼ buttons allow you to define a starting value for the measuring range. The permitted input range is between 0 … 90% of the original measuring range (turn down max. 1:10). 4 mA is output when the value that has been entered is reached..
2.3.2 FINALVAL	**Sets the end value of the measuring range** The ▲ and ▼ buttons allow you to define an end value for the measuring range. The permitted input range is between 10 … 100% of the original measuring range (turn down max. 1:10). 20 mA is output when the value that has been entered is reached.
2.3.3 Z-CORR	**Zero-point correction of the display and output signal** The message "CONFIRM" appears on the display when selecting the subsidiary menu item with the OK button. By holding the OK button pressed for at least 2 seconds the applied pressure is specified as the starting value for the output signal (4 mA), and the display is zeroed. The message "CONFIRM" disappears from the display.
2.4 TRIM	**Trimming the display and output signal**
2.4.1 OFFSET	**Trimming the zero point** The message "CONFIRM" appears on the display when selecting the subsidiary menu item with the OK button. By holding the OK button pressed for at least 2 seconds the applied pressure is specified as the starting value for the measuring range and the output signal (4 mA). The message "CONFIRM" disappears from the display.
2.4.2 FINALVAL	**Trimming the end value** The message "CONFIRM" appears on the display when selecting the subsidiary menu item with the OK button. By holding the OK button pressed for at least 2 seconds the applied pressure is specified as the end value for the measuring range and the output signal (20 mA). The message "CONFIRM" disappears from the display.
2.4.3 SAVE	**Saves the settings** The message "CONFIRM" appears on the display when selecting the subsidiary menu item with the OK button. By holding the OK button pressed for at least 2 seconds the settings are saved, and the message "CONFIRM" disappears from the display. Both of the functions (2.4.1 and 2.4.2) must have been carried out in order to save.
3 SIGNAL	**Signal parameters**
3.1 FUNKTION	**Function selection** "LINEAR" (linear function) “2SQR” $y = \sqrt{x}$ “2SQR3POW” $y = \sqrt{x^3}$ cut off 2 % “2SQR5POW” $y = \sqrt{x^5}$
3.2 DENSITY	**Input of the density** settable range: 100 … 9999 kg/m³ Conversion is only applicable to the units [mFH], [cmFH] and [mmFH].
3.3 DAMP	**Configuration of the damping** settable range: 0 … 100 s
3.4 SIMULAT	**Simulation of the output signal** settable range: 3.7 … 22 mA
4 SETTINGS	**Basic settings**
4.1 DISPLAY	**Configuration of the display unit**
4.1.1 UNIT P	**Configuration of the unit for pressure** Units: bar, mbar, g/cm², kg/cm², Pa, kPa, Torr, atm, mmWS (mm H20), mmHg, PSI, mFH*, cmFH*, mmFH* The conversion of all pressure-related parameters is performed automatically. *Input of the density is required. (see 3.2)
4.1.2 UNIT T	**Configuration of the unit for temperature** Units: °C and °F
4.2 HART-ID	**HART-ID (only to be set with HART® devices in multi-drop mode)** Set the desired ID no. (between "0" and "15"), and confirm this with the OK button. It is only necessary to configure this number if you want to operate the device in multi-drop mode (connection of a number of HART® devices). If the ID no. is set to "0", the multi-drop mode is deactivated, and the measurement transducer operates in analog mode.
4.3 USER-L	**Configuration of the user's security level** For security reasons it is necessary to enter the password before configuring the security level. Confirm this with the OK button. The password is factory-set to "0000". Security levels: "0": the whole menu system is enabled "1": the following menu items are enabled: 1 Display, 3 Signal, 4.3 USER-L "2": the following menu items are enabled: 1 Display, 4.3 USER-L
4.4 PASSW	**Configuration of the password** For security reasons it is necessary to enter the previous password before configuration. Confirm this with the OK button. The password is factory-set to "0000". Then set the new password, and confirm this with the OK button. ☞ If you have forgotten your password, you can request the master password, which is fixed at manufacture, from BD SENSORS.
4.5 LANGUAGE	**Selection of DE or EN as the user language**
5 SERVICE	**Service**
5.1 FACTORY	**Reset to factory settings**
5.2 ERR CURR	**Definition of the current** settable values: 21.6 mA or 3.8 mA The selected error current is output in response to a malfunction in the electronics.
5.3 TYPE	**Display of the device type**
5.4 SER-NO	**Display of the set serial number**
5.5 VERS	**Display of the program version**

Structure of the menu system