

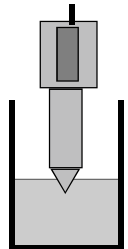
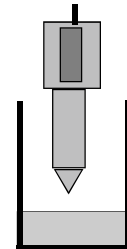
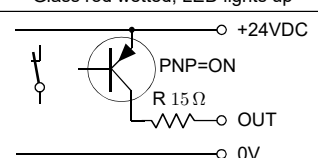
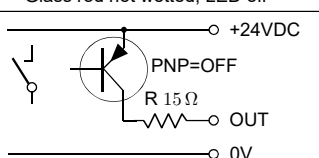
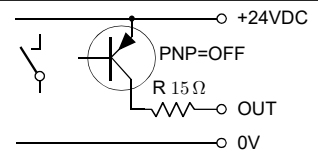
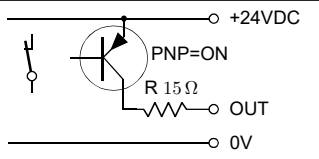
## Operating manual: FDN-010-300-OP

### Optical fill level sensor

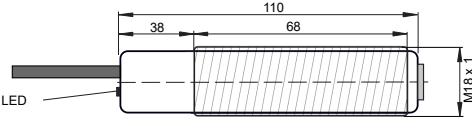
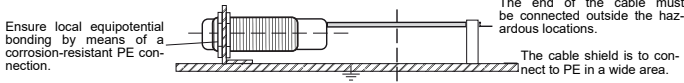
- For fill level detection with glass rod prisms
- For use in Ex Zones (1), 2, (21), 22
- Light/dark switching selectable via polarity of supply voltage
- Housing M18



II 3(2)G Ex nA [op is Gb] IIB T4 Gc  
II 3(2)D Ex tc [op is Db] IIIA T135°C Dc

	Type	FDN-010-300-OP	
<b>Technical Data</b>			
Gas Ex protection designation		II 3(2)G Ex nA [op is Gb] IIB T4 Gc	
Dust Ex protection designation		II 3(2)D Ex tc [op is Db] IIIA T135°C Dc	
For use in Ex Zones		Zones (1), 2, (21), 22	
Performance Level (PL)		PL b, according to EN 13849-1	
Safety integrity level		SIL 1, according to EN 61508	
Safety-related reliability PFHd [1/h]		1.75 x 10 <sup>-6</sup>	
MTTFd [Years]		65.2 years, according to EN 13849-1	
Light Source		Infrared 870nm	
Measuring range		10cm (On white paper 80g, 20cm x 30cm)	
Maximum optical radiant power		<=35mW	
Maximum optical radiant intensity		<=5mW/mm <sup>2</sup>	
Optical aperture angle		approx. 10°	
Response time		5ms / 100Hz	
Output type		PNP type, 100mA, short-circuit protected	
Pollution degree		4, according to EN 60664-1 in accordance to EN 60664-1	
Device designation according to EN 60947-5-1/2		D3A18SP1	
Utilization category according to EN 60947-5-1		B, according to EN 13849-1	
Supply voltage, Ue		24VDC±10%	
Absolute maximum supply voltage, Um		30VDC	
Current consumption		45mA	
Maximum power dissipation		0.9W	
Input type		Sensitivity selection RSEL, PNP compatible <sup>note 1</sup>	
Housing		M18, brass Ms 58, nickel plated	
Enclosure rating		IP 67	
Ambient working temperature range, T <sub>amb</sub>		-20°C up to +70°C	
Storage temperature range		-20°C up to +70°C	
Relative humidity		15% ... 90%, noncondensing	
EMC, shock and vibration resistance		Vibration: 30g at 20Hz to 2kHz. Shock: 50g in each direction (X, Y, Z).	
Connection cable		4 + PE x 0.5mm <sup>2</sup> , TPU, shielded, halogen free, leads numbering marked, for drag chaining, length: 10m	
Accessories		<b>Included</b>	<b>Optional</b>
		• 2x nuts M18	
Function and LED Indication		 Glass rod wetted, LED lights up	 Glass rod not wetted, LED off
Wiring Diagram			
Wiring Diagram, inverted function			
Note 1: Input RSEL, selecting sensitivity: Not connected or connected to 0V = High sensitivity. / Connected to 24VDC = Low sensitivity			

FDN-010-300-OP\_e1/2023-08-14/MP

Dimensions		
EX related markings	<b>CE</b> Typ: FDN-010-300-OP Gas: II 3(2)G Ex nA [op is Gb] IIB T4 Gc ATEX:  Tamb: Manufacturing date:	Manufacturer with Address Electrical data according to table Dust: II 3(2)D Ex tc [op is Db] IIIA T135°C Dc Declared by manufacturer according to 2014/34/EU -20°C up to +70°C Number 5 to 8 of the Serial Number (Year / CW)
Safe equipotential bonding for Ex devices	 <p>Ensure local equipotential bonding by means of a corrosion-resistant PE connection.</p> <p>The end of the cable must be connected outside the hazardous locations.</p> <p>The cable shield is to connect to PE in a wide area.</p>	

### Operating Manual / EC-/EU-declaration of conformity

#### Installation prescriptions for Ex hazardous locations

It is necessary to take into consideration all the valid international and national rules and regulations (IEC 60079-14). Do not exceed the maximum ratings. The electrical connections must be exactly as shown in the wiring diagram. The local equipotential bonding connection is corrosion-resistant and durable to connect. The protective earth (PE) is solid connected with the housing. The cable shield should be connected to the protection earth. The cable have to be installed and protected against damages. Install cables with termination fittings or put them in cable tray systems in a manner to avoid tensile stress at the termination fittings. Adequate strain relief must be provided. The end of the cable must either be installed within a certificated Ex housing or must be installed outside of any Ex area. Use only original manufactured fibre optics and additional optical lenses, other additional optical lenses are not allowed in hazardous locations. The product FDN-010-300-OP may only be installed and operated within Ex zones 2 and 22. The limited optical radiation may operate inside Ex zones 1 and 21.

#### General Installation Prescriptions

Do not exceed the maximum ratings. The electrical connections must be exactly as shown in the connection diagram. The cable shield must be connected short. The cable shield should be connected to the protection earth, large-surfaced. Connection cables must not be installed parallel to high voltage cables. During electrical installation, the power must be disconnected from the device.

#### Function at standard connection of the supply voltage

The sensor type FDN-010-300-OP detects wetting of the tip of the glass rod. If the glass tip is wetted, the LED lights up and the output switches to +24VDC. If the glass tip is not wetted, the LED goes off and the output switches to 0V. The load must be connected against 0V.

#### Function at inverse connection of the supply voltage

The sensor type FDN-010-300-OP detects a wetting of the tip of the glass rod. If the glass tip is wetted, the LED lights up and the output switches off. If the glass tip is not wetted, the LED goes off and the output switches to +24VDC. The load must be connected against 0V.

#### Glass rod prism

The sensor can only fulfill its function together with a suitable glass rod prism, D=10mm / L=300mm.

#### Sensitivity selection, input RSEL

If the sensor LED lights up even when the glass rod tip is not wetted, the RSEL input must be set to +24VDC.

#### Maintenance

The sensor is maintenance-free. Deposits on the glass tip lead to a malfunction and must be kept clean. Repairs may only be carried out by the manufacturer.

#### General Safety Information

The sensors may only be installed, connected and commissioned by trained specialists. The sensors must not be used for accident prevention. If the plug disconnect fuse is removed and the connection cable is connected or removed when it is live, there is a danger of ignition. During installation, operation and maintenance, all relevant EU and national regulations and directives, especially with regard to explosion protection, must be observed. Among others these are: EN 60079-14, ATEX 118a, single-directive 1999/92/EG.

The sensors conform to the following standards:

IEC/EN 60079-0:2018, IEC/EN 60079-1:2014, IEC/EN 60079-15:2010, IEC/EN 60079-28:2015, IEC/EN 60079-31:2014, EN 60529:2014, EN 60950-1:2006, EN 61326-3-1, EN 61000-4-2 bis EN 61000-4-6, EN 61000-6-1/-2, EN 61000-6-4, ATEX directive: 2014/34/EU, Machine directive: 2006/42/EG, EMC directive: 2014/30/EU, RoHS directive: 2011/65/EU.

#### General Notes, disposal

We reserve the right to modify our products. Our products are designed in such a way, that it has the least possible adverse effect on the environment. It neither emits or contains any damaging or siliconized substances and use a minimum of energy and resources. No longer usable or irreparable units must be disposed of in accordance with local waste disposal regulations.

#### EU-Declaration of Conformity

ATEX declaration by manufacturer according to the ATEX directive 2014/34/EU. ATEX certificate for the production of Ex products according to the ATEX directive 2014/34/EU No: SEV 21 ATEX 4580, QAR No. CH/SEV/QAR21.0009/01, Eurofins Electric & Electronic Product Testing AG, Luppmenstrasse 3, CH-8320 Fehraltorf. Ident. No.: 1258  
 The conformity of the devices with all used standards and directives and the EC-type examination certificate and the observation of the Quality Management System ISO 9001:2015 with the ATEX module „Production“, declares:

Ehrendingen, 14.8.2023

Pablo Ledergerber, Matrix Elektronik AG