

OPERATING AND MAINTANANCE MANUAL PETROOPT ATEX OPTICAL SENSORS

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	Atex Certificate	

1. DEVICE DESCRIPTION AND OPERATING PRINCIPLE:

PetroOPT ATEX sensors (manufactured by PETROSTER Sp.J.) are optical sensors designed for detecting liquid substance leaks using dry or wet methods in category II, III, and V systems, in accordance with EN 13160-1. Depending on the application, they can also serve as sensors for production processes and other utilities related to liquid level detection, such as an overfill sensor. They are dedicated for operation with PETROSTER control units but are also compatible with most available control systems. The sensors are equipped with a continuous cable monitoring system, in compliance with PN-EN 13160-1 requirements, allowing differentiation between an alarm triggered by a sensor state change and an alarm caused by cable damage. Depending on the application, they may also be used as sensors in industrial processes.

They are optical sensors equipped with a measurement optical system designed to detect liquids by recognizing changes in light refraction when the optical element is immersed in or emerges from a liquid, depending on the application. In the non-triggered state (not immersed in liquid), the sensor outputs a voltage signal of approximately 4.5V. When the sensor is triggered—i.e., when light refraction changes due to immersion in liquid—the voltage drops below 1V. The control unit detects and interprets these readings, triggering the corresponding alarm signals as required.

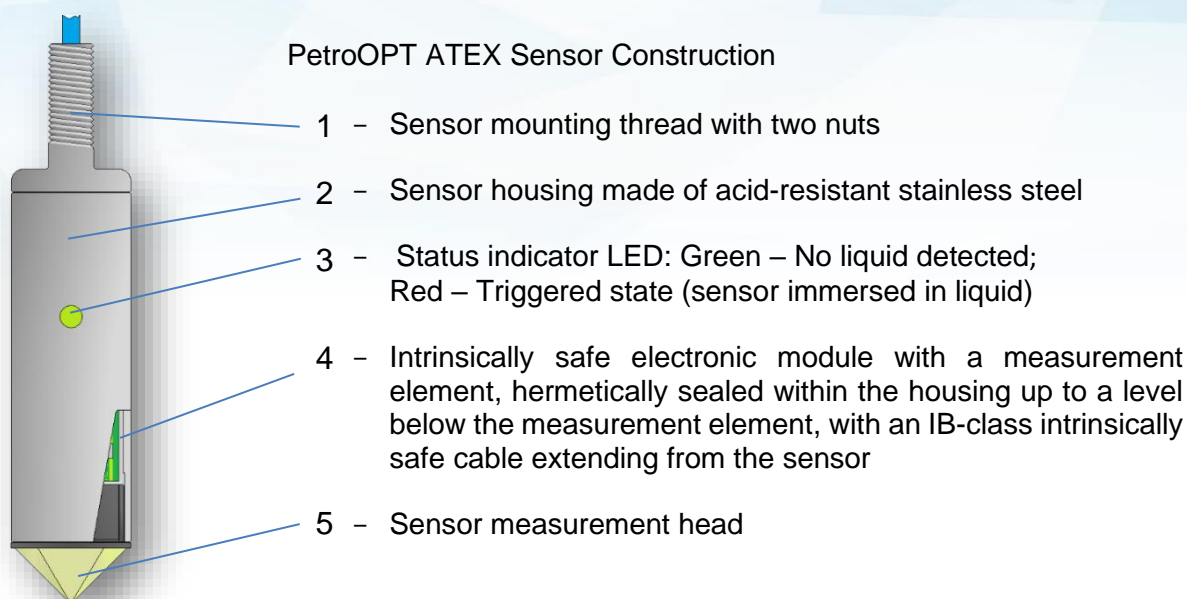
PetroOPT ATEX sensors are designed with a simple construction, utilizing a high-precision measurement element manufactured with industrial-grade technology, ensuring high reliability and failure-free operation. They are engineered to maintain minimal operating hysteresis, resulting in a very high level of measurement accuracy. The housing is made of acid-resistant stainless steel, while the measurement element is produced using industrial-grade technology. Additionally, the IB-class cable allows PetroOPT ATEX sensors to be used with a wide range of media.

The sensors comply with intrinsic safety requirements and can be used in explosive hazard zones, including Zone "0" for gases, dusts, and mists of substances with explosion groups up to IIC.

They are certified under the number JSHP 20 ATEX 0065X. They meet the requirements of the ATEX Directive 2014/34/EU and are manufactured in accordance with PN-EN IEC 60079-0:2018-09 and PN-EN 60079-11:2012 standards. The sensors are designed for operation in environments containing gases, vapors, and mists of substances with explosion groups up to IIC, within a temperature range of -30°C to +80°C. They have a temperature class of T6 for applications in ambient temperatures up to 75°C and T5 for applications up to 80°C.



2. SENSOR CONSTRUCTION:



Inside the sensor, there is an electronic module that is hermetically sealed with potting material and connected to a cable. The cable is oil-resistant, designed for intrinsically safe systems, and shielded. It contains three numbered black conductors:

- 1 – PWR (Power supply)
- 2 – SIG (Signal output)
- 3 – GND (Ground)

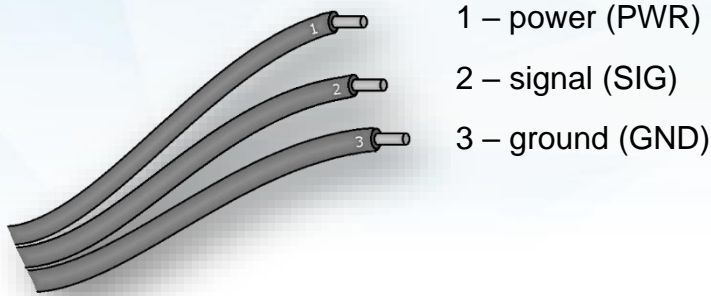
The sensor housing, along with the measurement head, is permanently joined during the manufacturing process, forming an integral, non-dismantlable unit. Threaded nuts on the housing are used for sensor installation.

3. INSTALLATION INSTRUCTIONS:

The sensor should be placed in the monitored space in a way that ensures access to the expected location of liquid presence or leakage. This means that in the case of a dry system, it should be installed at the lowest point of the monitoring space, while in a wet system, it should be installed at the highest point. The use of an additional retention container is recommended. It is recommended to install the sensor in a vertical position, with the measurement head facing downward. Side mounting is also allowed. Mounting the sensor with the head facing upward is not recommended, although it is permissible in specific cases. However, this may lead to condensation dripping onto the sensor, causing it to trigger.

The sensor is equipped with a mounting thread at the cable outlet, fitted with two nuts for installation. The mounting bracket should be prepared so that its end can be inserted between the nuts, securing the sensor by tightening the bracket between them. It is not recommended to mount the sensor using a bracket with a hole, as this would make sensor replacement difficult due to the need to pull the entire cable through the hole. Another possible installation method is free-hanging mounting, where the sensor is suspended at an appropriate cable length. In this case, the cable must exit the monitored space through a gland ensuring proper sealing. The sensor is designed for operation in a clean environment and serves an alarm function, with an expected lifespan of approximately six years..

The PetroOPT ATEX sensor is powered via a three-core cable. The wire ends of the connection cable should be connected to the appropriate terminals of the intrinsically safe barrier module:



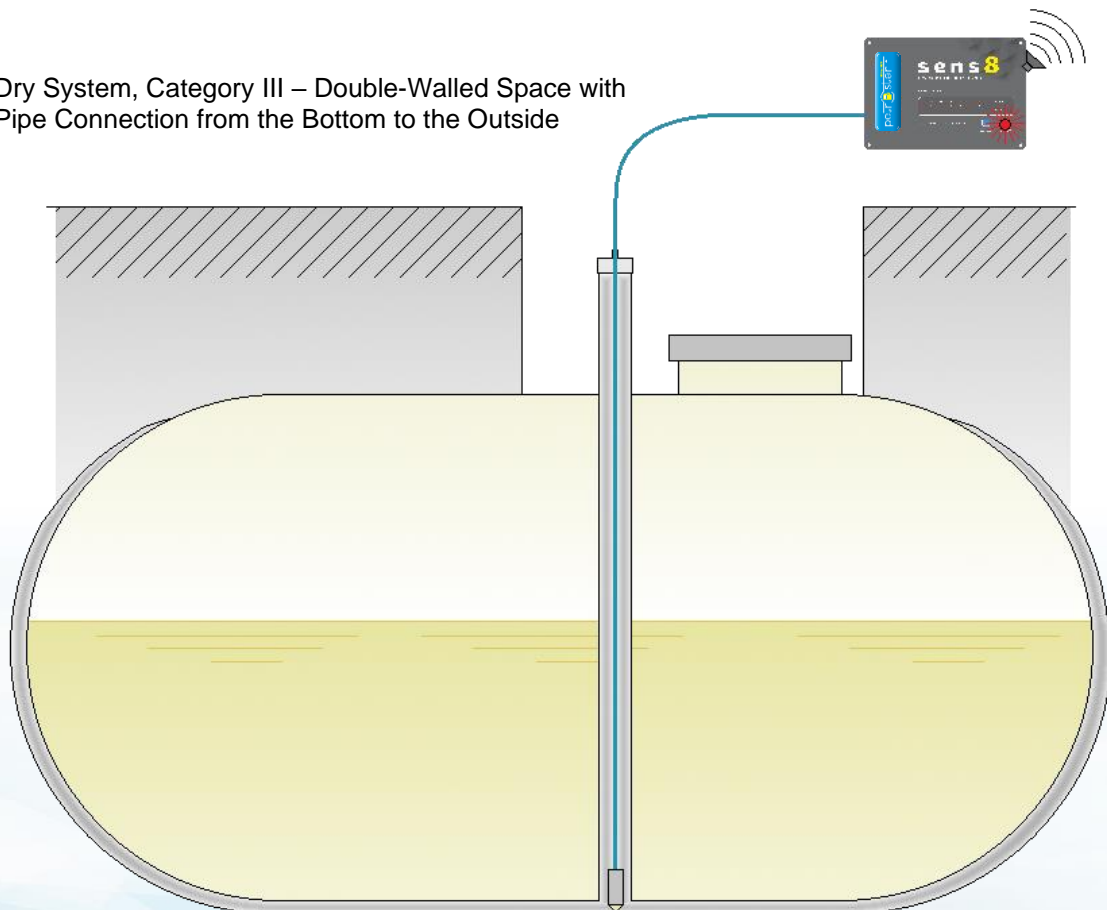
The sensor circuits must not be grounded. If grounding of the sensor circuits is necessary, galvanic isolation of all circuits must be ensured in accordance with PN-EN 6007911. All connections must be made with the monitoring control unit powered off.

Depending on the type of control unit, after connecting the sensor, the alarm system activation threshold must be set to ensure proper triggering. When connecting to the PETROSTER Sens8 control unit, it is recommended to use the predefined sensor configuration from the list or the "sensor auto-calibration" function. To meet regulatory requirements, the leak detection system should be equipped with a non-resettable visual and audible alarm, ensuring it is noticeable by the operator, or it should be integrated into the control system. Additionally, it must support a cable continuity monitoring system.

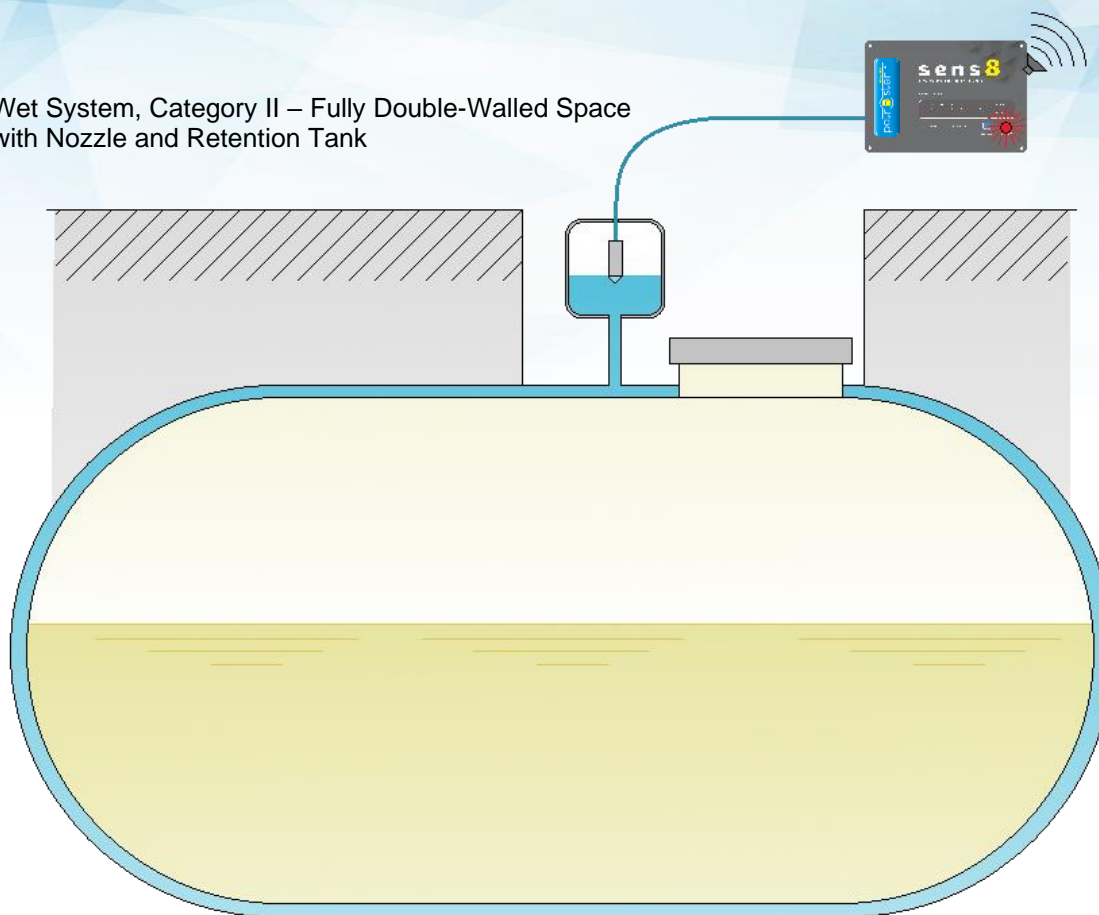
4. EXAMPLES OF SENSOR APPLICATIONS:

For various categories of leak detection systems, in accordance with EN 13160-1:

Dry System, Category III – Double-Walled Space with Pipe Connection from the Bottom to the Outside



Wet System, Category II – Fully Double-Walled Space with Nozzle and Retention Tank



5. MAINTENANCE AND OPERATION:

The sensor should be used according to its intended purpose and maintained within the specified inspection intervals. To ensure proper operation, a service inspection is recommended every six months and required at least once a year.

Inspection intervals may be shortened if operating conditions indicate the need for more frequent maintenance, such as internal company regulations or harsh working conditions (e.g., sensor contamination, medium condensation, etc.). Inspections should be carried out by an authorized service technician and must be documented with an appropriate inspection report.

The inspection should include:

- Visual inspection of the sensor, wiring, and connections.
- Cleaning the sensor by removing deposits and dirt from the housing and measurement head using a soft cloth or brush.
- Checking the electronic functionality of the sensor by simulating an alarm condition.

If an alarm condition is detected, the cause of sensor activation must be eliminated, and before reusing the sensor, it must undergo servicing along with a mandatory functionality check. If any deviations from the sensor's normal operation or damage are detected, the sensor must be replaced with a new one of the same type.

If any mechanical or electronic failure affecting the sensor's operation is detected, or if a failure could lead to improper operation in the near future, the sensor must be replaced immediately. Repairs are not foreseen for this sensor.

6. TECHNICAL PARAMETERS OF THE SENSOR:

Nominal supply voltage	12 V DC
Current consumption	80mA
Ambient temperature	- 30 ^{0C} ≤ Tamb ≤ + 75 ^{0C} (Temperature class T6) - 30 ^{0C} ≤ Tamb ≤ + 80 ^{0C} (Temperature class T5)
Relative humidity	up to 95%
Enclosure protection rating	IP65

7. SENSOR INPUT PARAMETERS:

U _{i max}	=	12.5 V (DC)
P _{i max}	=	1.3 W
I _{i max}	=	190mA
L _{i max}	=	negligibly small
C _{i max}	=	negligibly small

8. SENSOR OUTPUT PARAMETERS (SIG):

Maximum output voltage	U _o = U _o of the circuit connected to the power supply terminals
Maximum output current	I _o = I _o of the circuit connected to the power supply terminals
Maximum external inductance	L _o = L _o of the circuit connected to the power supply terminals
Maximum external capacitance	C _o = C _o of the circuit connected to the power supply terminals



J.S. Hamilton Poland Sp. z o.o.

(do dnia 30.04.2018r. JOAiCW TEST Sp. z o.o.)

Jednostka Notyfikowana NB 2057

ul. Wyzwolenia 14
41-103 Siemianowice Śląskie



CERTYFIKAT BADANIA TYPU UE

- (1)
- (2) Urządzenie lub system ochronny przeznaczony do użytku w atmosferze potencjalnie wybuchowej
Dyrektywa 2014/34/UE
- (3) Certyfikat badania typu UE Nr: **JSHP 20 ATEX 0065X**
- (4) Produkt: **Czujnik optyczny PetroOPT**
- (5) Producent: **PETROSTER Sp.J.**
Jan Dziura-Bartkiewicz, Grzegorz Bartkiewicz
- (6) Adres: **30-240 Kraków, ul. B. Leśmiana 2**
- (7) Niniejszy produkt wraz ze swymi odmianami jest określony w załączniku do niniejszego certyfikatu oraz w wymienionych w nim dokumentach.
- (8) J.S. Hamilton Poland Sp. z o.o., Jednostka Notyfikowana nr 2057, zgodnie z Artykułem 17 Dyrektywy 2014/34/UE Parlamentu Europejskiego i Rady z dnia 26 lutego 2014, zaświadcza, że produkt został uznany za zgodny z zasadniczymi wymaganiami zdrowia i bezpieczeństwa, dotyczącymi projektowania i budowy produktów przeznaczonych do użytku w atmosferze potencjalnie wybuchowej, przedstawionymi w załączniku II Dyrektywy.
Oceny i wyniki badań zostały wyszczególnione w poufnym raporcie Nr JSHP/RW/53/20/RM
- (9) Zgodność z wymaganiami bezpieczeństwa i ochrony zdrowia zrealizowano poprzez zgodność z normami:
PN-EN IEC 60079-0:2018:09 **PN-EN 60079-11:2012**
(EN IEC 60079-0:2018) (EN 60079-11:2012)
- (10) Jeśli za numerem certyfikatu umieszczono znak „X”, wskazuje to, że produkt podlega szczególnym warunkom użytkowania określonym w załączniku do niniejszego certyfikatu.
- (11) Niniejszy certyfikat badania typu UE odnosi się tylko do projektu i konstrukcji określonego produktu. Certyfikat nie obejmuje pozostałych wymagań Dyrektywy dotyczących procesu produkcji i wprowadzenia produktu do obrotu.
Niniejszy certyfikat obowiązuje w całości z załącznikiem (załącznikami).
- (12) Oznakowanie produktu musi zawierać poniższe symbole:



II 1G Ex ia IIC T6...T5 Ga




Damian Wróbel
Kierownik
Jednostki Certyfikującej

Siemianowice Śl., dnia 07 października 2020 r.

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