Applications

- Monitoring of oil separators on drilling platforms and ships
- Produced water monitoring
- Detection of oil leakage into cooling water
- Detection of oil in condensate and boiler feed water
- Monitoring of drinking water

Features

- Measurement of oil using fluorescence principle
- Free-fall flow cell prevents window fouling
- Optional closed flow cell for condensate
- User-specific calibration to as many as 8 oil grades
- Ex version EEx-p

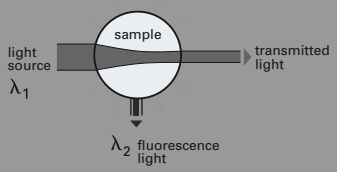
ON-LINE
OIL TRACE MONITOR
OILGUARD

SIGRIST
PROCESS-PHOTOMETER

FUNDAMENTALS

Detection of oil traces = protection of the environment

Wherever people work with oil, there is an unremitting danger of environmental pollution. In cases where residual oil is discharged, e.g. on offshore platforms, strict limits have to be observed. Where cooling water is discharged into natural bodies of water, and in the treatment of drinking water, even the tiniest traces of oil must be detected. Continuous measurement allows to react immediately to process malfunctions or accidents.



Sigrist oil trace monitors work on the fluorescence principle. The aromatic constituents of mineral oil possess the property of radiating visible light whenever they are illuminated by UV light. This effect is called fluorescence. The higher the oil concentration, the more intensive the fluorescent light. This makes it possible to detect dispersed mineral oil unambiguously in spite of cross-sensitivities, e.g. sensitivity to dispersed solids.

Measuring method

OilGuard uses the long-proven Sigrist dual-beam method. The sample and a reference standard are illuminated alternately by light from a UV light source. The amounts of fluorescent radiation from the sample and reference are then measured by a detector and compared. This method compensates the effects of light source aging, temperature changes, etc., in very simple fashion.

Free-fall or closed flow cell

Especially for applications involving regular contamination with oil or other pollutants, Sigrist offers the proven free-fall measuring system. Because it effectively eliminates contact between the sample and the flow cell windows and walls, no errors are caused by deposits and servicing is substantially reduced. In the case of hot media, purge air helps to prevent condensation on the windows.

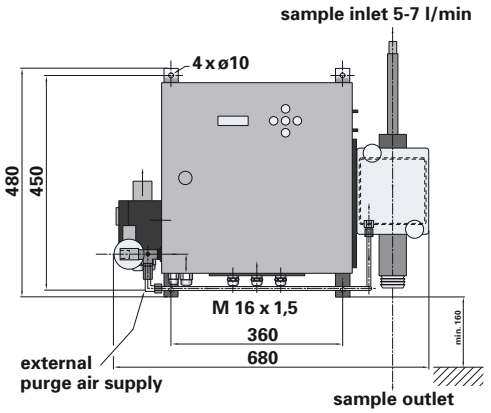
A closed flow cell is available optionally for clean media such as condensate or drinking water.

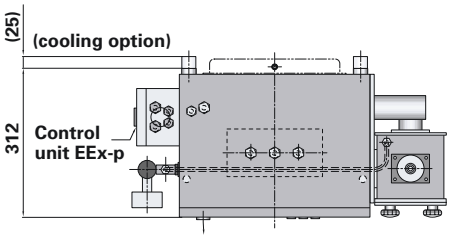
Ex protection

A pressurized-enclosure version is offered for installation in areas requiring explosion protection. In this case, servicing of the flow cell and calibration checks can be carried out without switching off the power supply or disabling the explosion protection.

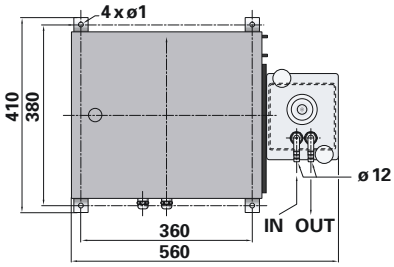
DIMENSIONS AND CONNECTIONS

Dimensions

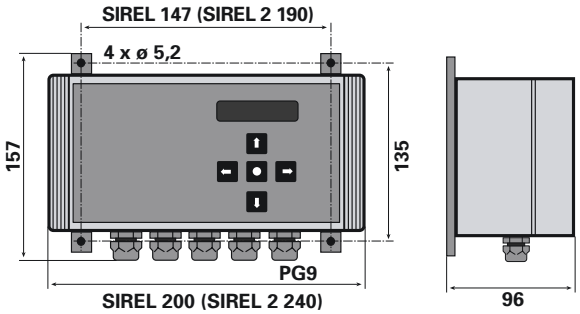




OilGuard Ex with free-fall flow cell PVDF

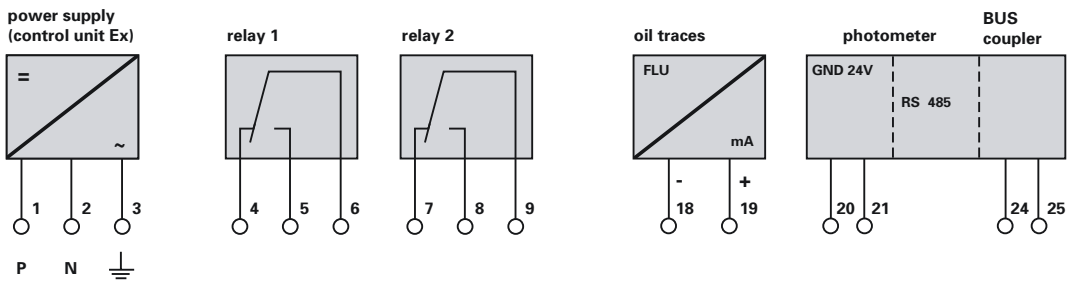


OilGuard with closed flow cell

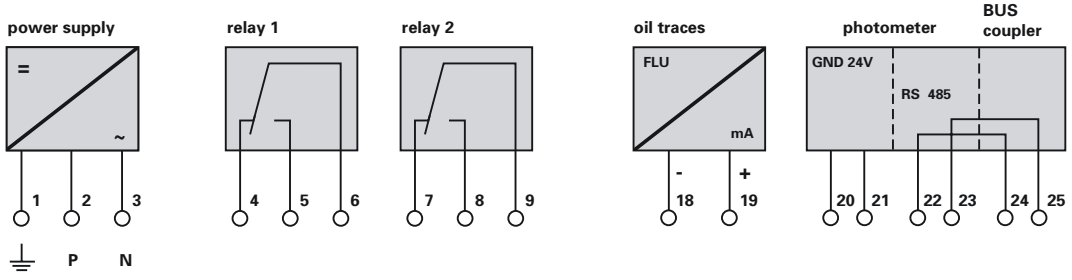


control unit SIREL

Wiring diagram OilGuard Ex



Wiring diagram SIREL für OilGuard



OPERATION AND INSTALLATION

Operation and communication

The SIREL control unit is used to operate the OilGuard. Its two-line LC display and plain-text operator guidance makes it very easy to operate, configure and service the OilGuard. The SIREL possesses a 0/4 .. 20 mA current output and two independently configurable relay contacts that can be used for limit or alarm functions. In the case of OilGuard Ex for explosive atmospheres, the SIREL is integrated into the photometer enclosure.

A bus coupler is available optionally for connection to PROFIBUS DP. This setup permits direct transmission of the readings and control of the instrument via the digital interface.

Sample supply and processing

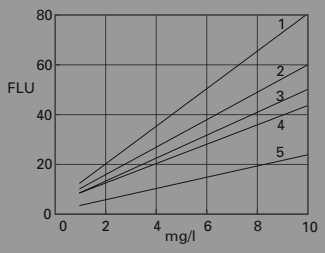
The OilGuard must be fed with a gas-free sample with the most homogeneous possible oil droplet size. In the case of the free-fall flow cell, it is also important to maintain continuous sample flow of 5..7 l/min. Degassing and a continuous flow rate can be ensured with the optionally available deaeration vessel. If the droplet size is not guaranteed to be homogeneous by the process itself, a suitable pump can be inserted ahead of the instrument for homogenization.

Installation / mounting

The OilGuard is designed for wall mounting (see sketch). Opaque hoses should be used for sample inlet and outlet. It is important to protect the flow cell against direct exposure to sunlight.

CALIBRATION AND UNITS

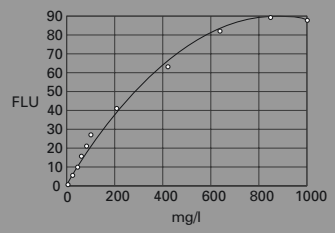
Fluorescence measurement



The fluorescent intensity of different oils depends on the amount of aromatic constituents they contain. PAH's (polycyclical aromatic hydrocarbons) are the main contributors to fluorescence. Each grade of oil has its own fluorescent "fingerprint" as a result of its composition – as illustrated by this graph, which compares the figures for various types of oil.

1 Lube oil
2 Cutting oil
3 Crude oil
4 Heavy fuel oil
5 Diesel oil

Calibration



Basic calibration of the OilGuard is carried out independently of oil with quinine sulfate in FLU. 1 ppm of quinine sulfate corresponds to a fluorescent light intensity of 1 FLU (fluorescence unit).

For checking the calibration later on, a calibration glass is provided that produces a defined fluorescent light intensity. This makes it easy to check or recalibrate the instrument at any time.

For calibration with oil, oil must be fed in various concentrations over the desired measuring range in a defined form. This can be done right on the spot or under specific laboratory conditions. The correlation between the reading in FLU and the oil concentration, as plotted from lab measurements for example, generally produces a nonlinear calibration curve (as in the graph shown here). The OilGuard makes it possible to program up to eight such curves for various oils. Note: the inversion point at higher concentrations is important, because it limits the measuring range.

Effect of solids

The scattered light produced by solids is effectively suppressed by suitable optical filters. As a result, the effect of solids on the measurement is negligible. The following rule of thumb applies: If the solids concentration in mg/l is numerically the same as the full scale figure in FLU, the resulting cross-sensitivity will be about 3%. In actual practice it has been found that even higher solids concentrations are admissible.

SPECIFICATIONS

Oil trace measurement	**Measuring principle:**	UV Fluorescence
	Measuring span:	0 ... 100 FLU; 0 ... about 1000 ppm (dependent on oil type)
	Measuring ranges:	8 ranges, even for different oil types, freely configurable
	Sensitivity:	0.5 ... 5 ppm for mineral oils (dependent on oil type)
Photometer	**Installation:**	on-line measurement
	Degree of protection:	IP 65, optionally IP66
	Weight:	37 kg
	Enclosure material:	stainless steel 1.4301 (OilGuard Ex) sheet steel, paint finish (OilGuard)
	Ambient temperature:	-20°C ... +40 °C (up to +50°C with optional cooling)
	Ex protection:	EEx-p IIC T4
	Cooling:	water cooling 1l/min, 5bar, in/outlet 10 mm
Free-fall flow cell	**Flow cell material:**	stainless steel 1.4435 or PVDF
	Sample temperature:	95°C (PVDF); 40°C (VA)
	Sample pressure:	pressureless measurement
	Sample flow:	5 ... 7 l/min
	Connections:	PVDF: inlet 16 mm, outlet 50 mm VA: inlet 12 mm, outlet 35 mm
Closed flow cell	**Flow cell material:**	stainless steel 1.4435
	Window material:	quartz / borosilicate glass
	Seals:	Neoprene
	Sample temperature:	60°C
	Sample pressure:	600 kPA (6 bar)
	Sample flow:	0.5 ... 2 l/min
	Connections:	inlet/outlet 12 mm
SIREL control unit (integrated into the photometer in the case of OilGuard Ex)	**Power supply:**	85 ... 264 V / 47 ... 440 Hz
	Power input:	65 W
	Display:	LC display with plain text information
	Current output:	0/4...20 mA; max. load 600 W
	Limits:	2 separately configurable relay contacts 250 V AC, 4 A
	Degree of protection:	IP 65
	Weight:	1.5 kg

Represented by:

SIGRIST
PROCESS-PHOTOMETER

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