Fluid Sensors
Oil Sensor

Detailed Technical Data
Model: BA

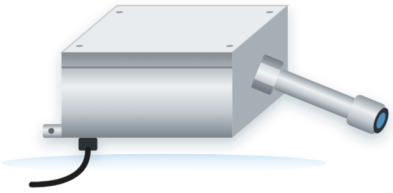
Features

Medium	Water/fluids
Use	Oil measurement
Purpose	Industrial
Monitor type	Scattered light detection via photocell
Connection	Flanged
Installation locations	Submergence or inline
Storage	-20°F to 158°F



Mechanical

Probe face	Flat
Housing rating and MOC	NEMA 4X,304 SS
Sensor design	Scatter photocell
Connection, piping	Flange, 2” ANSI B16.5 150#
Dimensions	29.3”OAL X 10”W X 5”H, 4” sensor shaft is part of length
Detection range	2-500 ppm
Pressure range	0-50 psi
Flow rate	0-50 GPM
Measuring accuracy and repeatability	+/-2 ppm at 15 ppm; +/-10 ppm at 100 ppm
Measuring frequency	7 times per minute
Sample period	8.6 seconds
Operating temperature range	Less than 158°F (70°C)
Mount orientation	Horizontal or vertical
Roll, pitch & yaw limits	No restrictions
Standard alarm setting	15 ppm, other settings by request from factory at order
Shipping weight	18 lbs
Certifications	USCG: 162.050/30130/1, IMO: MEPC.60(33)
Certifications	American Bureau of Shipping: 95-NN7502-X



Electronics

Supply voltage	115VAC/1pH/50/60Hz., 1AMP
Output signal	4-20mA
Output 2	SPST, 5A relay, 220VAC
Other outputs	0-2 VDC for optional remote ppm display

The BA is an instrument that detects and measures the amount of oil in water and compares the results with a threshold value. This threshold value can be adjusted to any level between 2 and 500 parts per million (PPM) and at such values required by local and international regulations. Samples are taken at a frequency which complies with marine sampling standards. An alarm relay or 4-20mA output is provided, and activated when the measured oil concentration is higher than the factory preset value. Many options can be provided such as extended temperature range, explosion proofing and 4-20ma outputs.

Mounting Reference
Inline 2” tee mounting: The sensor is installed into a water line with a 2-inch internal diameter tee that is welded or threaded into the line. Although it may be mounted in any orientation, it is suggested that it be mounted horizontally with the name plate on top. The flange is located on the tee so that when the probe body is inserted, it will protrude 1/4 to 1/2 inch into the inside diameter of the water line. In the design process, ensure the sensor will never sample air and be far enough down the line so that any air bubbles generated by a pump have time to dissipate. This may mean in gravity systems the installation of the unit be at a low point in the pipe run or installed in a "trap" arrangement. Sediment build up will shorten the life of the seals. Ensure that the Sensor opening is clear of any protective covering such as tape. The flanges are then bolted together.

Calibration: The sensor has been calibrated at the factory to your specifications. There is no need to re-calibrate the unit during pre or post installation. Attempts to re-calibrate the unit may lead to voiding of the warranty

6007 S. Railroad Street
Burlington, WI 53105 USA 262.716.0105
sales@intell-i-watch.com.
© 1991–2026 Pan America Environmental, Inc. · Intell-i-Watch, A Pan America Environmental Brand

Fluid Sensors
Oil Sensor

General Theory of Operation

The sensor measures the concentration of oil in water. It is housed in an enclosure and sealed and bolted to a probe body and flange assembly. A mechanical assembly driven by a 7 RPM motor moves samples into and out of a sample chamber. The sample chamber is located in the probe body and contains a light source, sensor cells and a temperature compensating device. An electronic printed wiring board and power supply board perform the electro-optic calculation of the concentration of oil in water. These are the basic elements that measure the concentration of oil in water.

Within the sensor probe, light is directed into a chamber filled with a sample. The light is measured by two photo devices, which transform light into electric current. One cell, the transmit photocell, is situated so that light from the sensor's lamp can reach it directly. The second cell, the scatter photocell, is in the shadow of a light-absorbing pin, the occluding rod.

When the sample is clear, that is, when no oil is present, light from the lamp reaches the transmit cell unimpeded; no light reaches the scatter cell, which remains in the shadow cast by the occluding rod. When oil is present in the sample, the light is scattered by oil droplets and reaches the scatter cell. The angle between the transmit cell and the scatter cell favors the refraction angle for oil and tends to ignore the random scattering of particulate. As the concentration of oil in water increases, more light is scattered away from the transmit cell to scatter cell. The amount of oil in water is given by the ratio of scattered light to transmitted light. But since temperature differences affect photocell response, a temperature compensating Thermistor calibrates this ratio by correcting for discharge temperature changes. The sensor electronic board converts the electronic signals from the photocells to a voltage between 0 and 7 volts, which is proportional to the concentration of oil in water. To ensure that the oil in water concentration measured by the probe is the same as the concentration in the discharge line, the probe piston draws in and ejects a sample from the sampling probe chamber seven times a minute. The piston, which is driven by a gearmotor turning at 7 RPM, automatically wipes clean the window that covers the sensor lamp and photocells.

Operation
The sensor has no operator controls. If the set point for the oil in water concentration is exceeded, a local pulsating buzzer is sounded, red indicator light is lit and outputs activated. The red indicator light can be observed at the back of the unit, a few inches above the knurled nut that holds the cover in place. External alarms and indicators are the responsibility of the user.
To increase the life of the sensor, the unit should not be run dry for extended periods of time. Another way to extend the life of the unit is to slave the sensor to the pump or whatever is driving the water through the line.

PREVENTIVE MAINTENANCE
The following paragraphs describe the periodic preventive maintenance checks and actions that should be performed on the BA. The Lithium Grease used in the following checks and procedures is "White Lithium Grease, 30-140, NLGI Grade 2".

MONTHLY CHECKS
At monthly intervals the mechanical portions and the water tight integrity of the BA should be checked as follows:
-Remove power from the unit at the circuit breaker.
-Remove the knurled nut from the back of the unit and slide off the cover.
-Switch the power on.
-Check the sensor frame beneath the probe for droplets of water or water discoloration.
-Observe that the sensor plunger is reciprocating at 7 RPM or every 8.5 seconds.
-If any of the above conditions are not satisfactory, refer to the manual

6007 S. Railroad Street
Burlington, WI 53105 USA 262.716.0105
sales@intell-i-watch.com.
© 1991–2026 Pan America Environmental, Inc. · Intell-i-Watch, A Pan America Environmental Brand

Fluid Sensors
Oil Sensor

QUARTERLY CHECKS
At three month intervals, the unit must be lubricated using a high quality lithium grease as outlined below:
-Remove AC power from the unit at the circuit breaker.
-Remove the knurled nut and cover.
-Use a wooden or non-metallic device to coat the drive wheel with grease. Do not get excess grease on other components.
-Replace the cover and knurled nut.
-Restore power to the unit as required.

BIANNUAL CALIBRATION
At six month intervals the sensor should be removed from the line and recalibrated. This service is available from the manufacturer at a nominal charge. The unit may be calibrated on site with a calibration kit available from the manufacturer. The model number of the calibration kit is OA-3000 and contains the necessary equipment and oil to perform many calibrations. If all the above procedures are followed in a timely manner, no cleaning will be required.

6007 S. Railroad Street
Burlington, WI 53105 USA 262.716.0105
sales@intell-i-watch.com.
© 1991–2026 Pan America Environmental, Inc. · Intell-i-Watch, A Pan America Environmental Brand