



MODEL 9830-OWS OIL/WATER INTERFACE LEVEL SWITCH

User Manual

Arjay Engineering Ltd.
Oakville (Toronto), Canada, L6H 6C9

Tel . ++1 (905) 829-2418
Fax. ++1 (905) 829-4701

North America 1-800-387-9487



www.arjayeng.com
arjay@arjayeng.com

Oil / Water Separator Level Alarm



Reliable interface monitoring of oil/water separators, sump pits and containments for pump control and alarm

Over 30 years of Arjay's field proven HF capacitance technology has been applied to the 9820/9830-OWS oil water separator alarms. The sensing probe continuously monitors for oil to control pumps, operate valves, or activate alarms.

- capacitance technology does not foul or require cleaning
- no moving parts
- remote alarm unit mounts safely away from pipe

9820 | 9830-OWS

The 9820/9830-OWS sensing probe monitors the capacitance field around the active probe tip. As the volume of separated oil increases in the separator or is drawn down toward the probe tip, the probe capacitance changes. This change is used to activate the relay for alarm interface and control.

■ Features and Benefits

- no moving parts
- remote electronics via standard twisted pair
- available with Intrinsic Safety Barrier for Hazardous Locations
- high corrosion resistant Teflon and stainless steel wetted parts
- capacitance technology responds to all oil types
- HF capacitance technology does not require routine cleaning
- easy calibration and control set-up

■ Technical Specifications - Control Unit

Operating Temperature	-20°C to 60°C
Power Input	24 vdc or 110 vac or 220 vac
Alarm Relay	5 amp, DPDT, dry
Standards	UL, CSA
Enclosure	Type 4X, IP65
Optional	Lights and Buzzer

■ Technical Specifications - Sensor

Process Temperature	-60°C to 260°C
Ambient Temperature (probe head)	-60°C to 50°C
Approval	CSA Class 1, Zone 1 and 2, Div 1 and 2, Groups A,B,C,D (also available with an Intrinsic Barrier on the 9830-OWS) ABSA-CRN #0F07450.2



All calibration, control relays and power wiring is available at the main control unit. This can be safely mounted up to 1 km away from the sump.



The Model 9820-OWS version provides the electronics mounted directly to the probe for economical and compact installations.



The unique PMC circuit design, exclusive to Arjay, immediately converts the sensor signal to a frequency pulse for furtherance to the controller (9830 version).

Arjay SS-06



Arjay Engineering Ltd.
2851 Brighton Road
Oakville, Ontario
Canada L6H 6C9

tel
fax
N. America
email
web

++1 905-829-2418
++1 905-829-4701
1-800-387-9487
arjay@arjayeng.com
www.arjayeng.com



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1.0 INSTRUMENT OVERVIEW

1.1 FEATURES

- Push-button calibration
- RF Technology
- Double pole Double Throw (DPDT) 5A relay contacts
- 0 – 20 second time delay
- Adjustable sensitivity
- High or Low relay action
- No moving parts
- For use with any Arjay Level Probes

1.2 DESCRIPTION

The **ARJAY** 9830-ows oil level alarm is specifically designed for use in Oil/Water Separators and in Sumps. The unit senses the change in dielectric of water to oil using a RF capacitance measurement technique together with microcontroller technology for high resolution measurements. The **ARJAY** sensing probe is inserted into the vessel and a signal is sent to the remote controller. The **ARJAY** oil level alarm will activate a relay contact when the predetermined level of oil is reached. There are two main applications for the 9830-OWS.

The Oil/Water Separator must be of the type that is permanently filled with water. The water is gradually displaced from the vessel as the oil is introduced. The active sensing portion of probe is mounted below the oil pump suction and when the interface of oil reaches this active portion the 9830 alarms indicating the need to pump out the oil.

The Sumps normally have a pump with the suction on the bottom. The liquid level of the Sump is maintained above the active portion of the probe using a separate level device (e.g. Float). The 9830-OWS is used to sense an interface of oil before it is pump out of the Sump to the sewer. The 9830-OWS will also alarm if there is not sufficient liquid within the sump thus acting as a dry pump monitor.

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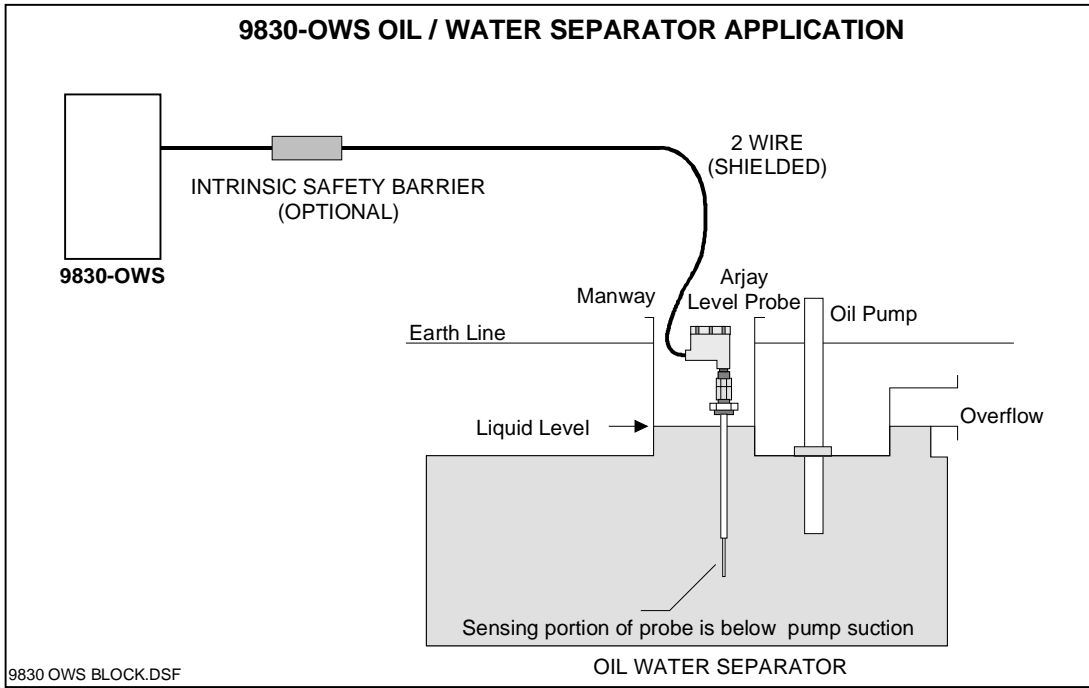


Figure 1.0

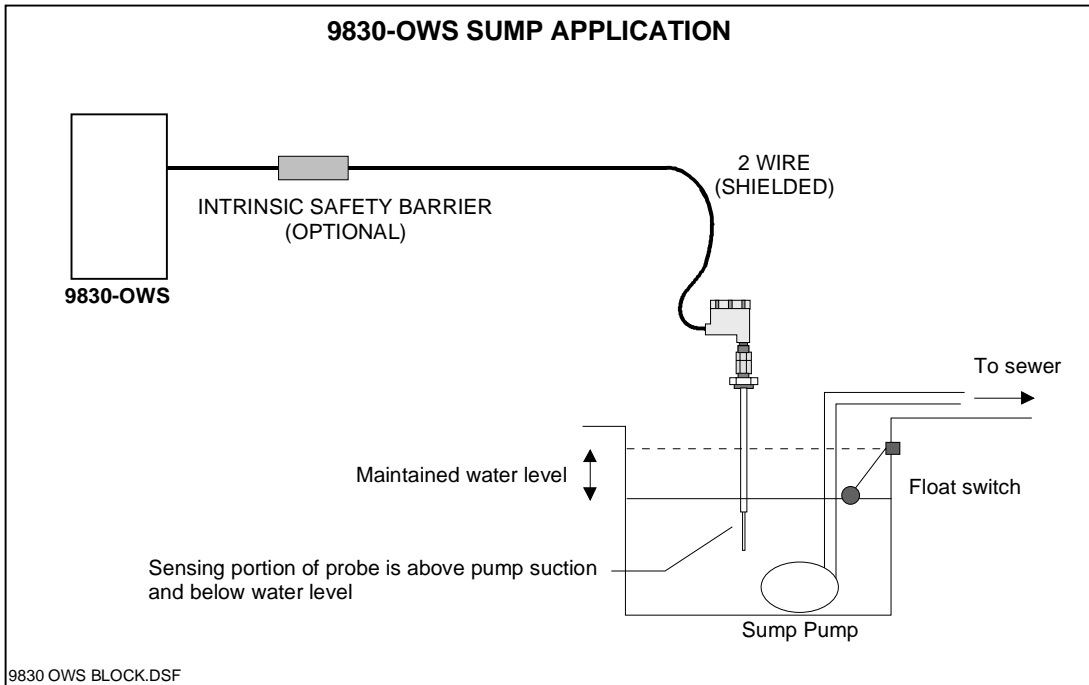


Figure 1.1

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OPERATION

The unit uses an RF Capacitance measurement technique for high resolution measurements. When the presence of oil displaces the water the level probe senses the decrease in capacitance and the control unit will indicate an alarm condition and change the state of it's dry relay contacts.

USER INTERFACE

Instrument status	2 color indicator: Green for normal operation, Red = instrument error, Red/Green (orange) for calibration confirmation.
Alarm Status	Red indicator: On when not in alarm, Off when in alarm.
Time delay	0 – 20 seconds.
Relay action	High or Low relay action. For high action, the relay is de-energized under normal conditions and energizes when there is a presence of oil. For low action, the relay is energized under normal conditions and de-energizes when there is a presence of oil.
Dielectric switch	Primarily used in high dielectric where there is a presence of water at time of calibration.

PERFORMANCE

Resolution	The unit measures capacitance in pF. Capacitance to Level translation depends on the surroundings and the type of material being measured. Capacitance: 0.4% of measured capacitance. Example: at 50pF, the resolution is 0.2pF and at 100pF, the resolution is 0.4pF.
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SENSOR CONNECTION

2 wire + shielded cable from PMC 2000 to controller.

RELAY CONTACTS

Failsafe. DPDT 5A (resistive load) /250VAC/30VDC dry contacts. Selectable high or low acting alarm.

POWER

115VAC or 220VAC @ 25mA max.
24VDC @ 60mA max.

MECHANICAL SPECIFICATIONS

Enclosure	Standard: Nema 4x
Dimensions /Weight	10" (254mm) x 8" (203.2mm) x 4" (101.6mm)depth / 4lbs. (1.81kg)

ENVIRONMENTAL SPECIFICATIONS

Operating Temp.	-20 to 60°C for Controller only. For remote probe:-40 to 80°C
Relative Humidity	90% max. with no condensation.

HARDWARE REV. 1.0	SOFTWARE REV. 9820_06 and higher	Page 5 of 12
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2.0 INSTALLATION

NOTE: If any damage to the instrument is found, please notify an Arjay Engineering representative as soon as possible prior to installation.

Choose the mounting location in accordance with good instrument practice. Extremes of ambient temperature and vibration should be avoided.

2.1 PROBES

Capacitance probes may be ordered at different lengths depending on the size and location of each oil/water separator or sump. Most OWS probes are Teflon coated with an inactive 316ss sheath covering the entire length of the probe with the exception of the last 4 inches. The length of the probe is specified by the customer and is determined by the height of oil interface that the customer wants be alarmed at. The exposed white Teflon portion of the probe tip is the active sensing portion so the alarm point has to be within this 4" section.

2.2 PROBE INSTALLATION

Standard probe entry into a tank is via a 3/4" NPT opening (standard probes) or 1" NPT opening (heavy duty probes). Flanges and concentric shields are available as options. The entrance configuration may vary depending on the application requirements.

USE WRENCH ON LOWER HEX . The probe fittings are compression type with Teflon ferrules assembled by applying torque between the two hex sections. The fittings are sealed at the factory to provide a compression seal capable of withstanding high pressures. Once the fittings are opened they cannot be reassembled without replacing the ferrules.

2.3 PULSE CARD INSTALLATION

Check that the pulse module circuit (PMC-2000) is installed into the probe head according to the installation drawing. Both circuit mounting screws are required to insure a good electrical ground. Check that the blue probe lead is secured to the PMC circuit terminal marked "P". (If coax cable is used from the probe to the junction box then connect the center wire of the coax to "P" and the braided coax shield to the ground screw in the junction box).

Wire the circuit card to the main control unit using two-wire shielded instrument cable 16-18awg (EG.BELDON 8760). DO NOT run these wires along side of high voltage wires. Connect the + & - terminals on the pulse card to the probe terminals marked + & - at the controller. Connect the shield of the cable to the 'S' terminal at the controller side only. Make sure that the PMC junction box is electrically grounded.

CAUTION: INSTALL PROBE WITH CARE: DAMAGE TO TEFLON SHEATH WILL CAUSE MEASUREMENT ERRORS.

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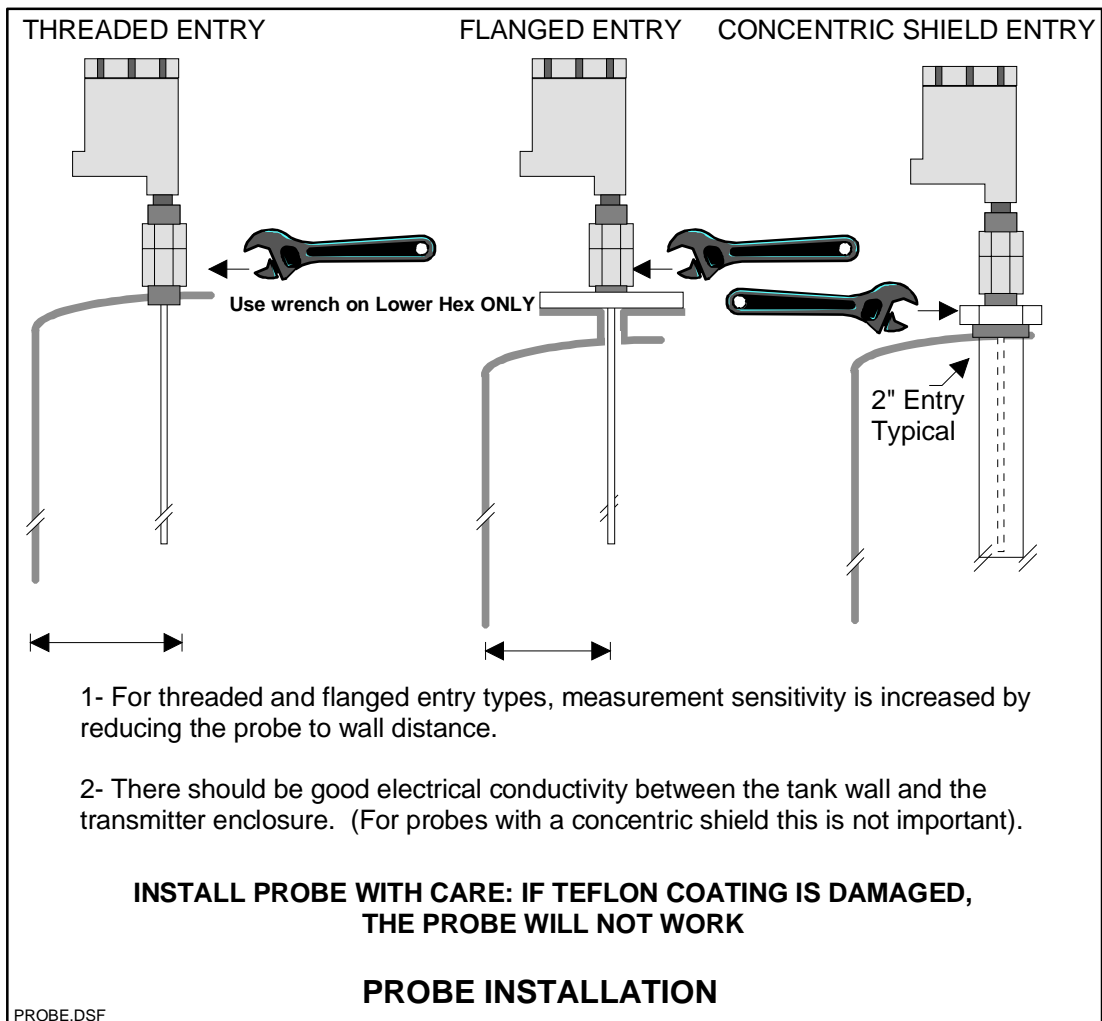


Figure 2.0

MODEL 9830-OWS	DOCUMENT TYPE USER MANUAL	DOCUMENT FILE NAME 9830OWSUM14.DOC	REV. 1.4
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2.4 ELECTRICAL INSTALLATION

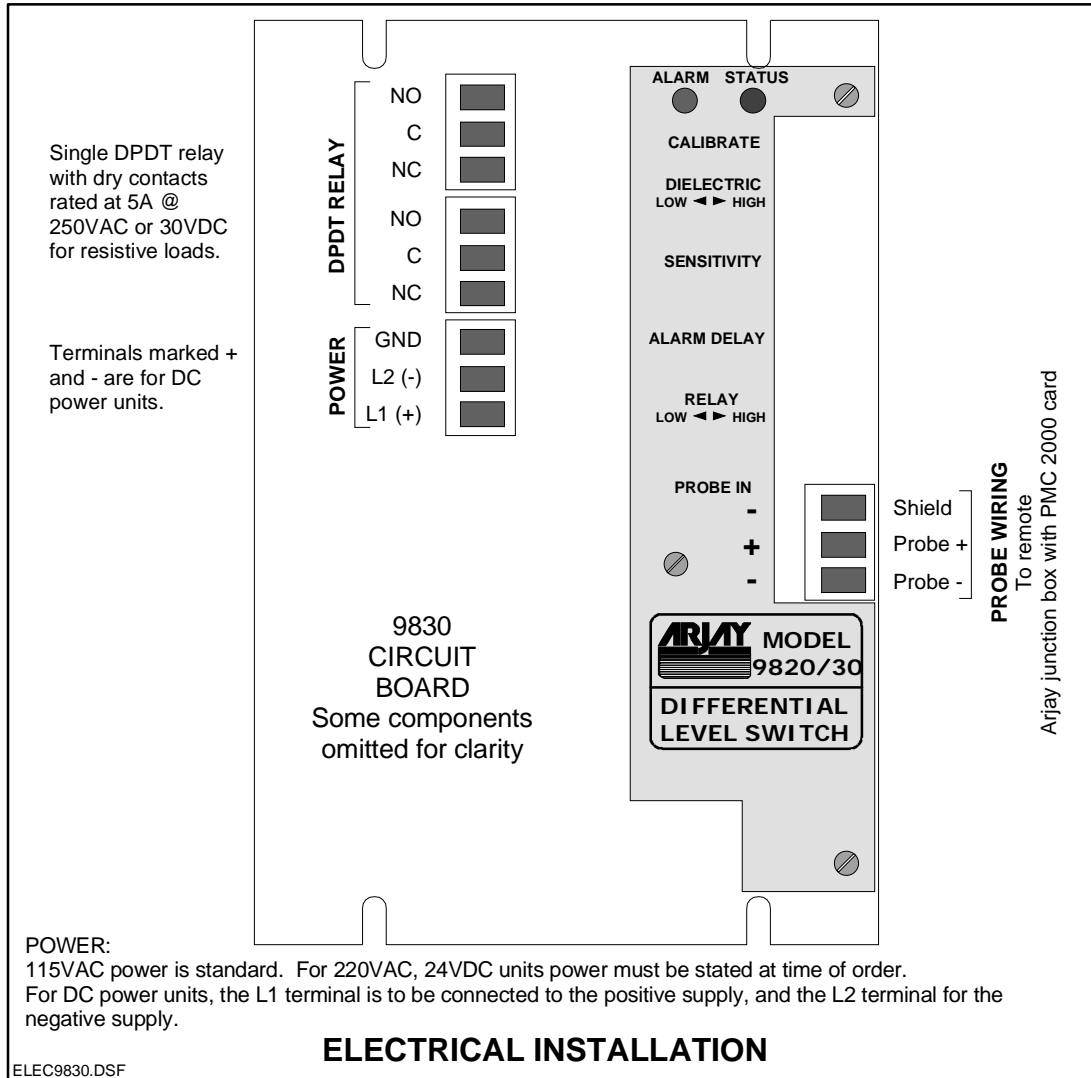


Figure 2.1

NOTE:

115VAC power is standard. Other power supply voltages are supported (220VAC, 24VDC) and must be specified at time of order.

APPLYING POWER THAN THAT MEANT FOR THE UNIT MAY CAUSE DAMAGE AND OR INJURY.

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3.0 STARTUP AND CALIBRATION

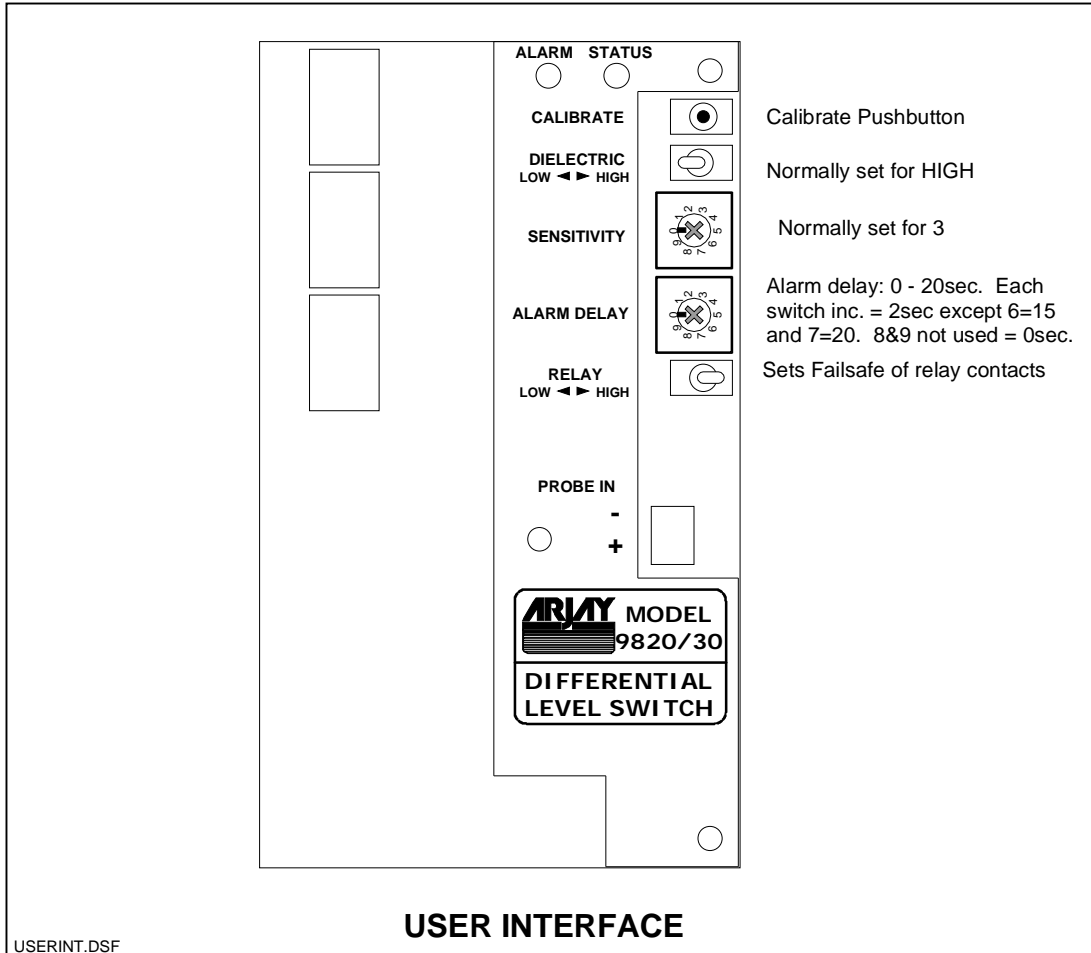


Figure 3.0

3.1 POWERUP

After the unit has been installed as per the installation procedure in section 2, power up the unit. The Status indicator should be Green. The red Alarm indicator may be on or off and is not valid until a successful calibration has been done.

If the Status indicator is red refer to the troubleshooting procedure in section 4.0 for details.

3.2 CONTROL AND FUNCTION SWITCHES

Set up the control and function switches as follows:

3.2.1 Failsafe

Put the selector in the "LO FAILSAFE" position. This will keep the relay energized during normal conditions. On alarm; the relay will de-energize. A power failure will also cause the relay to de-energize, signalling an alarm condition.

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3.2.2 Alarm Time Delay

This is set via the Alarm Delay switch. An alarm based on the Relay Action switch must be present for at least the time delay value for the relay to switch to the alarm state. There is no delay when switching off the alarm. The delay range is 0 – 20 seconds.

DELAY SWITCH SETTING	TIME DELAY
0	0 seconds
1	2 seconds
2	4 seconds
3	6 seconds
4	8 seconds
5	10 seconds
6	15 seconds
7	20 seconds
8 & 9	Not used and act as 0 seconds.

False alarms from disturbances can therefore be ignored. Position 8 & 9 are not used and are the equivalent to 0 seconds.

3.2.3 Sensitivity

This selector switch determines the amount of oil level change required to cause an alarm. The switch has a "0" to "7" range with "0" being most sensitive. "3" is used for most OWS applications. If unit still has false alarms adjust the sensitivity to the next number up. Position 8 & 9 are not used and are the equivalent to 0 sensitivity.

****INCREASING THE NUMBER WILL DECREASE SENSITIVITY****

3.2.4 Dielectric

The OWS probe should be calibrated with the probe submersed in water. The switch should be set to "HI" for this calibration.

3.3 CALIBRATION

With the unit wired as per the drawing #990251, power on the unit. The status LED should be green indicating that power is on and unit is getting no fault conditions. If the status led is red then unit is showing a fault. Check to make sure unit is properly wired to the pulse card. A wiring fault or pulse card failure will cause the status LED to be red. Check the wiring for continuity and proper polarity. To calibrate for OWS applications, verify the following function switch positions:

"TIME DELAY	Position "6" (15 seconds)
"SENS"	Position "3"
"FAILSAFE"	Lo failsafe
"DIELECTRIC"	Hi dielectric

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Make sure the Oil/water Separator is filled with water to capacity or the Sump level above the active portion of the probe. With the active sensing portion of the probe submerged in water, push the CALIBRATE BUTTON. The status LED will turn red momentarily. Release the button. The status led should be green and flashing on and off showing that it is in calibration mode. Push the calibration button one more time until it goes red. Release the button. Calibration is complete and status LED should be green and alarm status LED red showing that the relay is energized under normal conditions. The unit is now calibrated and will alarm when the sensing portion of the probe tip is exposed to about 2" of oil.

THIS COMPLETES THE SETUP AND CALIBRATION PROCEDURE FOR THE 9830 OWS

4.0 TROUBLESHOOTING

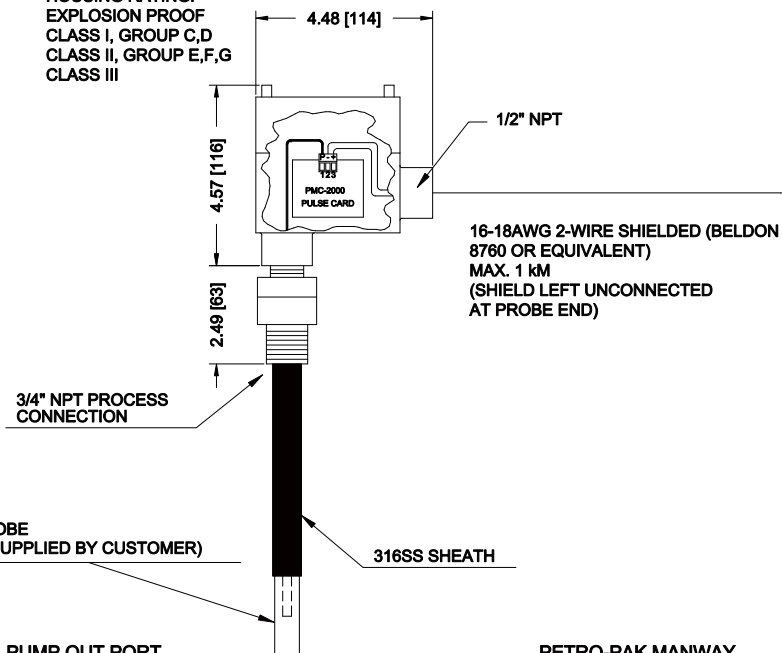
**Under normal conditions the status light on 9830 electronics (inside enclosure) should be Green and relay light should be Red. **

CONDITION	DO THIS
1. No indicators on at powerup	<ul style="list-style-type: none"> • Check power to unit • Make sure power applied is as specified for the unit. (e.g. 120VAC) • If power is ok, check the fuse. If the fuse is blown, call an Arjay representative to analyze why the fuse has blown.
2. Status indicator is RED (Fault Condition)	<ul style="list-style-type: none"> • Make sure there is a PMC 2000 card mounted in the remote junction box. • This indicates that the controller is not receiving a signal from pulse card (PMC 2000) and is weak, unstable, out of legal range, or is not present. • Verify that the polarity of the two wire shielded connection is correct such that "+" at controller to "+" at pulse card (PMC 2000) and "-" at controller to "-" at pulse card (PMC 2000). Measure with DC volt meter across "+" and "-" at pulse card (PMC 2000), it should read positive 9-10 Volts when plugged in. • Make sure there is no break in the wiring between controller and PMC 2000 card. • Disconnect probe (sensor) from "p" terminal of pulse card (PMC 2000). Verify if status LED goes to Green. • Replace the PMC 2000 card with a spare if available.

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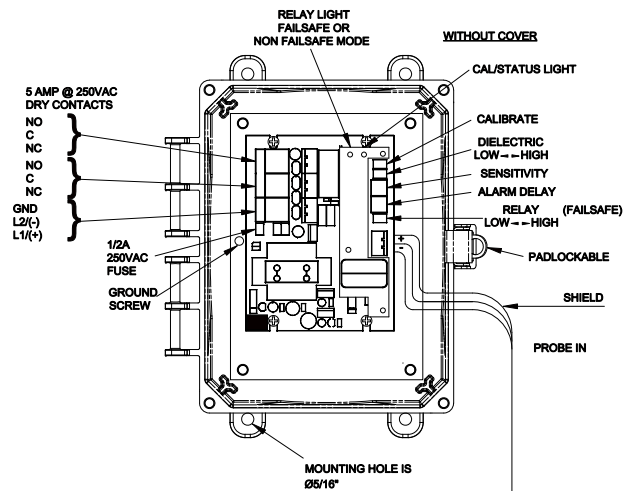
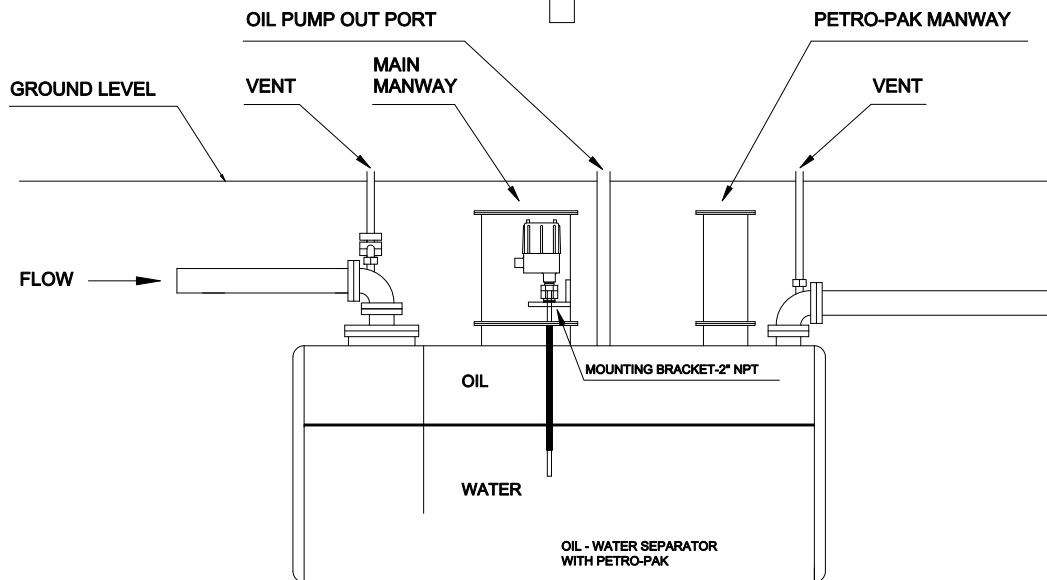
<p>3. False alarms</p>	<ul style="list-style-type: none"> • Add some time delay to unit. • If coax cable is used from sensors to pulse card (PMC 2000), make sure it is not coiled (may cause an increase in inductance). • Make sure there is no outside interference that may be causing false alarms such as an agitator, high voltage interference, or input flow to the tank affecting the probe. • Adjust the sensitivity switch to next setting to decrease the 9830's sensitivity. Test sensor after the setting has been increased to make sure the sensor can still reliably sense the presence of liquid. • Make sure separator or grease trap is filled up with water above the white Teflon (sensing area) of probe.
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HOUSING RATING:
EXPLOSION PROOF
CLASS I, GROUP C,D
CLASS II, GROUP E,F,G
CLASS III



TEFLON COATED PROBE
(LENGTH SUPPLIED BY CUSTOMER)

316SS SHEATH



TYPE 4X POLYCARBONATE ENCLOSURE

NOTE:
INPUT VOLTAGE PER ORDER
24VDC, 115VAC, 220VAC
TERMINALS MARKED (-) (+) ARE
FOR DC POWERED UNITS

DIMENSIONS ARE IN INCHES (mm)
ENCLOSURE IS A INTEGRA H8064HLL
ENCLOSURE DIMENSIONS ARE 8 X 6 X 4D (203.2 X 152.4 X 101.6D)
ENCLOSURE MOUNTING DIMENSIONS ARE 8.5 x 4 (215.9 X 101.6)

REV	DATE	DESCRIPTION	CHK'D	APP'D
3	15/10/08	CHANGED ENCLOSURE		
2	15/10/08	ADDED 1/2" NPT CONDUIT		
1	26/3/03	CHANGED ENCLOSURE TYPE		

		ARJAY ENGINEERING LIMITED		PROJECT: OIL/WATER SEPARATOR LEVEL SWITCH	
9830-OWS DIMENSIONAL & ELECTRICAL		SCALE N.T.S.		DWG. NO. 990251	
DWG. STATUS DRAWN: C.P. CHECKED: APPROVED:		DATE 2 11 99		SHT. 1	
REV. 3		TITLE		APP'D	