



# **MODEL 9830-LPS LEAK PAD SENSOR**

## **User Manual**

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# 9830-LPS

The 9830-LPS sensor monitors the capacitance field between the sensor pad and the floor. Through a single push button calibration the controller locks in on the capacitance field of all sensing pads. Any liquid that intrudes into the pad space will increase the capacitive field and initiate an alarm.

## ■ Features and Benefits

- sensor pads can be placed in key locations and tight spaces
- up to 3 sensor pads can connect to one control unit
- adjustable time delay and sensitivity to eliminate nuisance alarms
- remote electronics via standard twisted pair
- available with Intrinsic Safety Barrier for Hazardous Locations
- high grade epoxy and PVC wetted parts allow for corrosive environments
- capacitance technology responds to all types of liquids

## ■ Technical Specifications - Control Unit

Operating Temperature	-20°C to 50°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 - Sensing Pads

Operating Temperature	-60°C to 50°C
I.S. Approval	CSA Class 1, Zone 2, Div 2, Groups A,B,C,D (when ordered with Intrinsic Barrier Option)



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

Arjay SS-06



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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
- Single and multiple leak pad sensors
- High or Low relay action
- No moving parts
- For use with any Arjay Leak Pad Sensor

### 1.2 DESCRIPTION

The unit senses presence of liquid using a RF capacitance measurement technique together with microcontroller technology for high resolution measurements.

The control relay is always in failsafe mode. The relay action may be set for high or low acting.

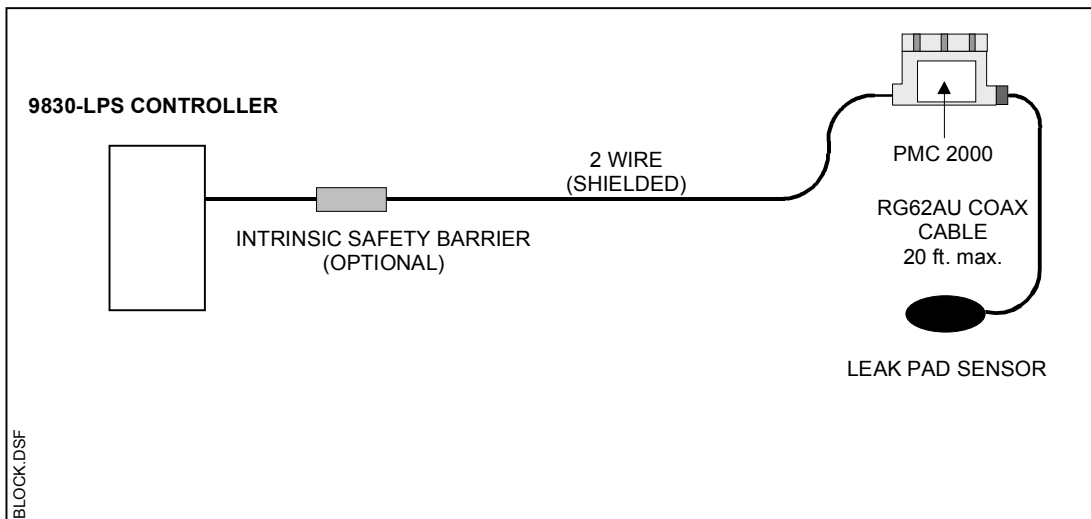


Figure 1.0

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## OPERATION

The unit uses an RF Capacitance measurement technique for high resolution measurements. When the presence of fluid occurs the leak pad senses the change in capacitance and the control units 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 energized under normal conditions and de-energizes there is a presence of liquid. For low action, the relay is de-energized under normal conditions and energizes when there is a presence of liquid.
Dielectric switch	Primarily used in low dielectric where there is no liquid present 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

Co-axial cable from Leak Pad Sensor to PMC 2000 card Junction Box (max. 20ft).  
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	8.5" (215mm) x 7" (178mm) x 4.5"(114mm)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.

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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. The leak pad should be placed in a safe location away from traffic.**

### 2.1 SENSOR

The leak pad consists of a sensor in a moulded weatherproof disc with an integral co-axial cable extending 20 feet to a junction box. Excess co-axial cable should be cut back instead of coiled up to reduce the chance of nuisance alarms. Enclosed in the housing is a pulse module circuit (PMC 2000) which changes the signal to a pulse signal, thus allowing the control electronics to be mounted up to one kilometre away.

One side of the disc has moulded nipples to raise the pad slightly off the floor or sensing area. Up to three leak pad sensors can be mounted to one controller.

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## 2.2 ELECTRICAL INSTALLATION

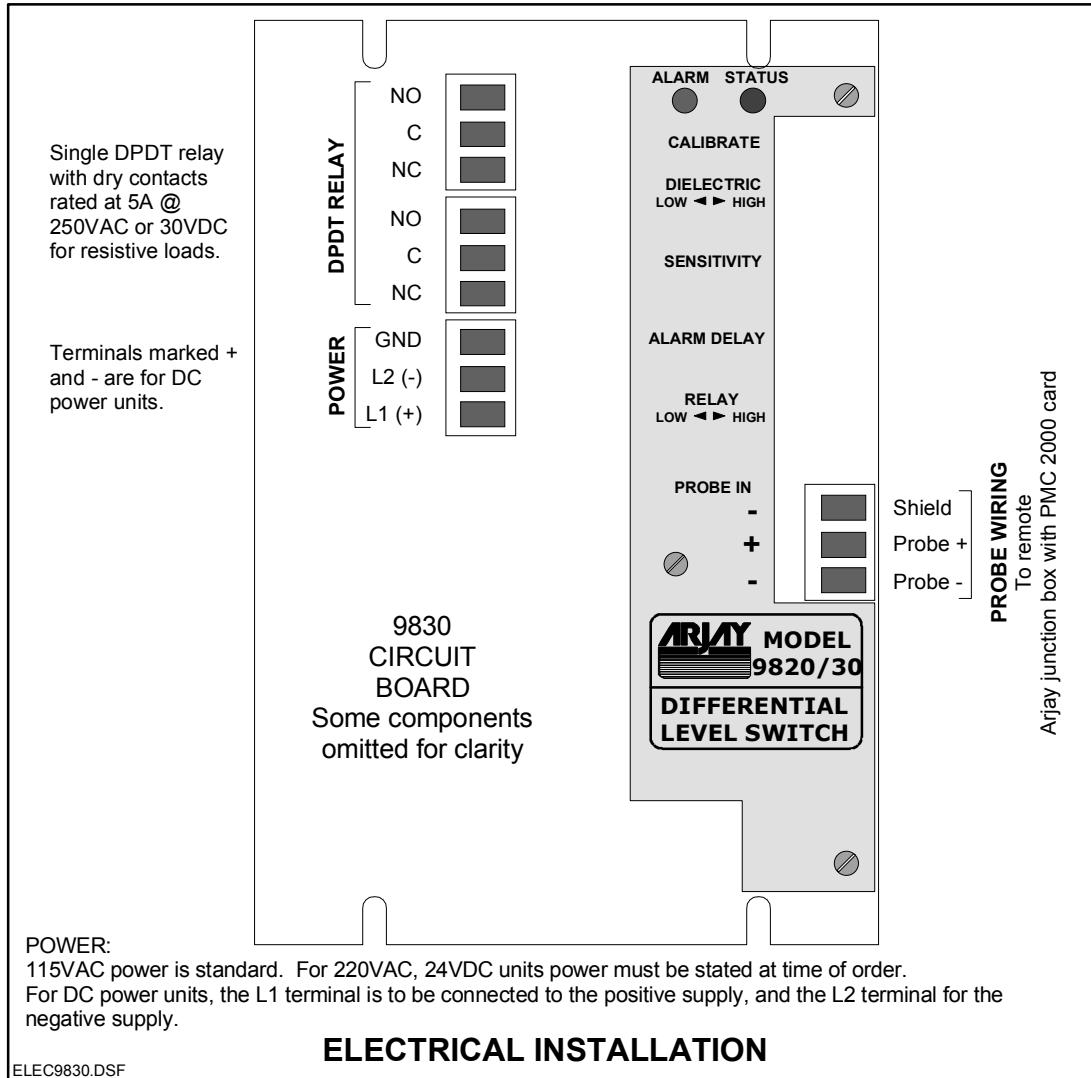


Figure 2.2

### 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

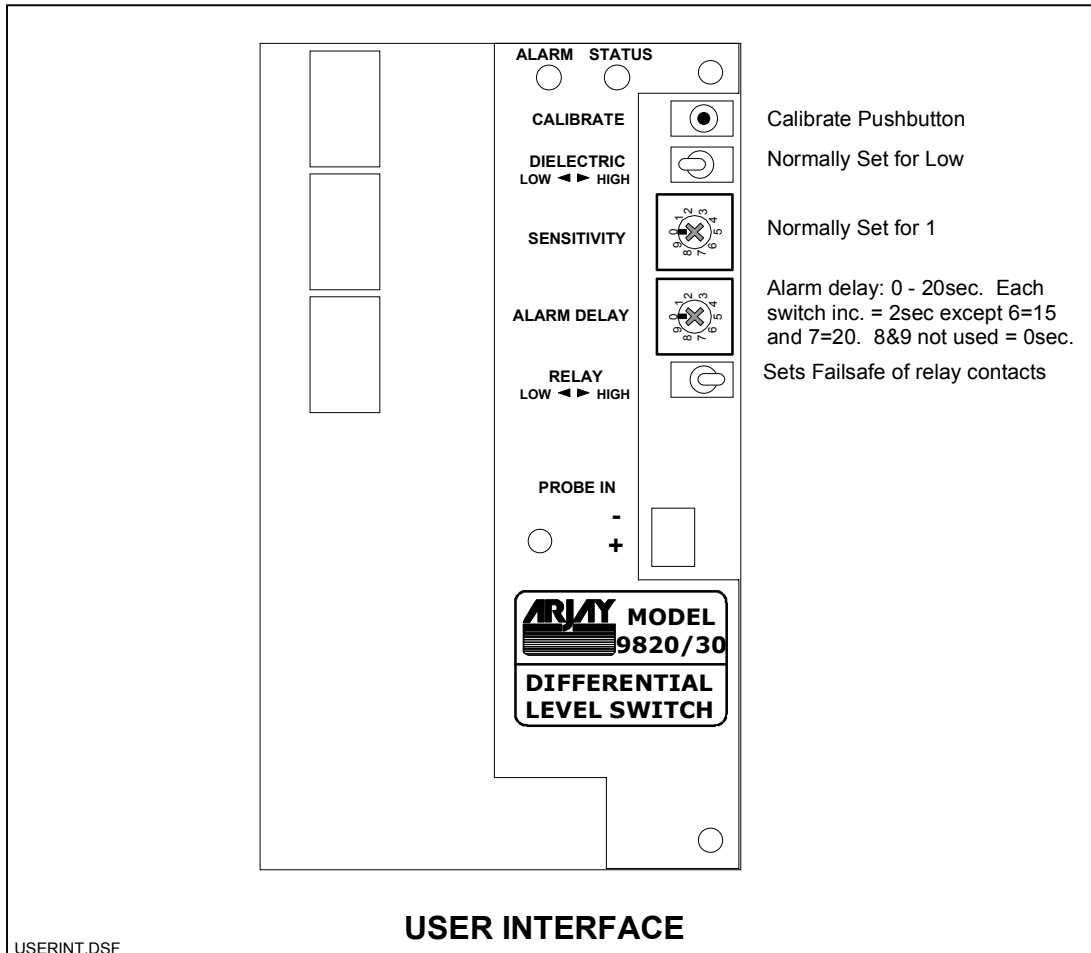


Figure 3.0

#### 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:

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### 3.2.1 Failsafe

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

### 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 fluid level change required to cause an alarm. The switch has a "0" to "9" range with "0" being most sensitive. "1" is used for most applications. If false alarms are occurring, make sure there is time delay on and coax cable from sensor is not coiled. 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.

### 3.2.4 Dielectric

The leak pad sensor should be calibrated during a dry condition. The switch should be set to "LO" for this calibration.

## 3.3 CALIBRATION

With the unit wired as per the drawing #990170, 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

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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, verify the following function switch positions:

"TIME DELAY	Position "6" (15 seconds)
"SENS"	Position "1"
"FAILSAFE"	Hi failsafe
"DIELECTRIC"	low dielectric

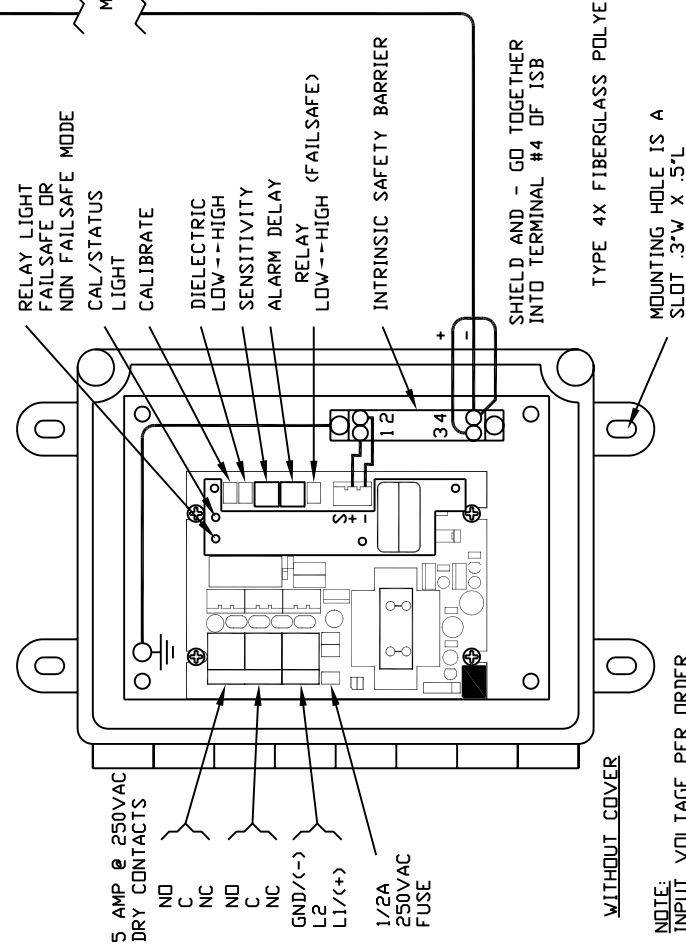
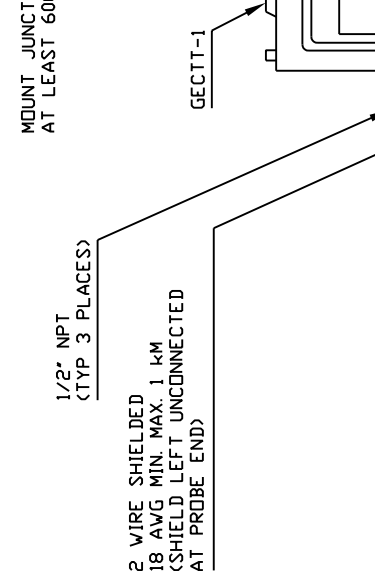
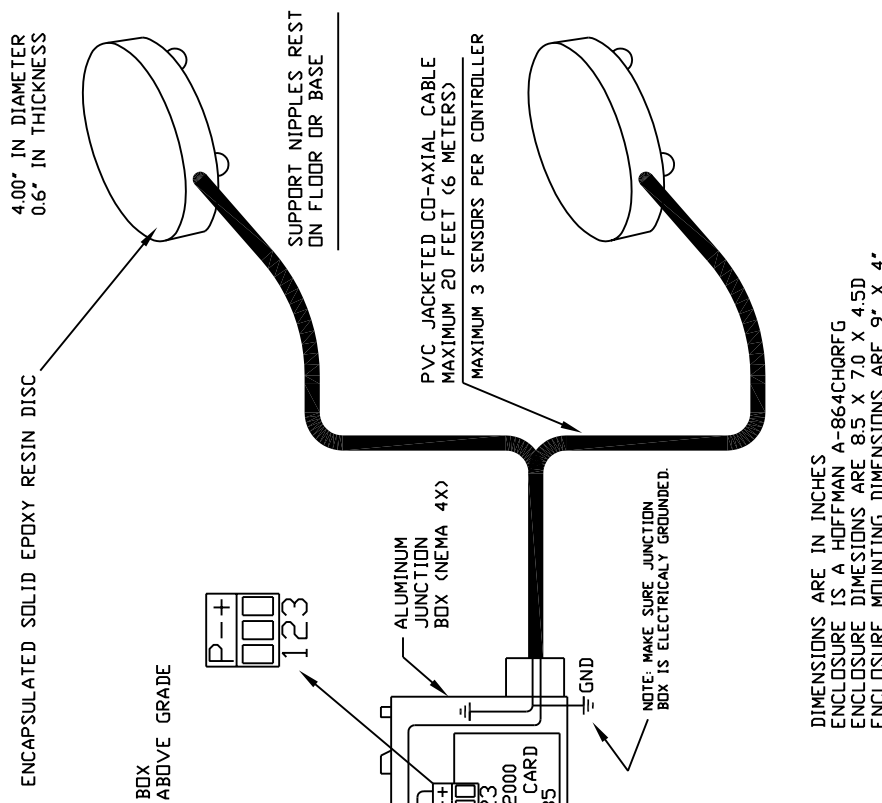
With the sensor in dry condition, push the CALIBRATE BUTTON. The status LED will turn red momentarily. Release the button. The status led should be green and flashing on and off showing that it is in calibration mode. Push the calibration button one more time until it goes red. Release the button. Calibration is complete and status LED should be green and alarm status LED red showing that the relay is energized under normal conditions. Verify the operation by placing a cup of water under the sensor causing it to go into alarm. Unit will also go into alarm by placing your hand on the leak pad.

## THIS COMPLETES THE SETUP AND CALIBRATION PROCEDURE FOR THE 9830 LPS

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## 4.0 TROUBLESHOOTING

<b>CONDITION</b>	<b>DO THIS</b>
1. No indicators on at powerup	<ul style="list-style-type: none"> <li>• Check power to unit</li> <li>• Make sure power applied is as specified for the unit.</li> <li>• If power is ok, check the fuse. If the fuse is blown, call an Arjay representative to analyze why the fuse has blown.</li> </ul>
2. Status indicator is RED	<ul style="list-style-type: none"> <li>• This indicates that the probe signal is either weak, unstable, out of legal range, or is not present.</li> <li>• Unplug the probe (sensor) connector from the 9830. Verify that the polarity of the two wire shielded connection is correct.</li> <li>• Make sure there is no break in the wiring between controller and PMC 2000 card.</li> <li>• Make sure there is a PMC 2000 card mounted in the remote junction box.</li> <li>• Replace the PMC 2000 card with a spare if available.</li> </ul>
3. False alarms	<ul style="list-style-type: none"> <li>• Make sure the time delay is on.</li> <li>• Make sure excess coaxial cable between the PMC2000 and the Leak Pad sensor is cut back and not coiled.</li> <li>• Increase the sensitivity switch to next setting. Test sensor after the setting has been increased to make sure the sensor can still reliably sense the presence of liquid.</li> </ul>



**ARJAY ENGINEERING LIMITED**

PROJECT: LEAK PAD SENSOR

TITLE: 9830-LPS-IS

DWG. STATUS: DRAWN

BY: C.P.

DATE: 6 9 02

APPROVED: [ ]

SCALE: N.T.S.

REF. DWGS. [ ]

DWG. NO. 990172

SHT. 1

REV. 1