



MODEL 9820/30-DPM

Dry Pump Monitor

User Manual

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A Product of Arjay Engineering Ltd.
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In-Line Dry Pump and Product Phase Detector

Pipe monitoring for dry run conditions or liquid phase changes

Over 30 years of Arjay's field proven HF capacitance technology has been applied to the 9820/9830-DPM pipe monitor. The unique in-line sensor continuously monitors for the change from a wet to dry condition or a liquid change from one dielectric to another.

- capacitance technology responds to any liquid type
- no moving parts
- remote alarm unit mounts safely away from pipe
- no intrusion into stream flow



9820 | 9830-DPM

The 9830-DPM sensor monitors a cross sectional area of the pipe and locks in on the capacitance field of the fluid passing through. A change toward a dry condition or a liquid of a different dielectric will upset the capacitive field and initiate an alarm.

The sensing plates are embedded into a wafer flange which provides monitoring without any intrusion into the stream flow

■ Features and Benefits

- wafer flange sensor for easy installation
- adjustable time delay and sensitivity to eliminate nuisance alarms from bubbles
- remote electronics via standard twisted pair
- available with Intrinsic Safety Barrier for Hazardous Locations
- PVC wetted parts for corrosive environments
- capacitance technology responds to all types of liquids
- non-intrusive sensor design does not restrict flow

■ 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 Probe

Operating Temperature	-60°C to 50°C
Approval	CSA Class 1, Zone 2, Div 2, Groups A,B,C,D (also available with an Intrinsic Barrier Option on the 9830 version)



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 (9830 version).



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



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



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1.0 INSTRUMENT OVERVIEW

1.1 FEATURES

- Push button calibration
- RF technology (ignores coating)
- Arjay pulse card system for simple safe remote control, calibration and maintenance
- Interchangeable and expandable components
- Standard time delay
- Hi/Low failsafe select
- Sensitivity adjustment and calibration features
- Optional lights, override switches, audio alarms, etc. are available
- No moving parts

1.2 DESCRIPTION

The **ARJAY** Dry Pump System comprises of the ARJAY Level-Ease Model 9820/30 control unit and a pump or pipe mount sensor. Typically, the sensor is mounted between the pump intake flange and the pipe flange although alternate sensor styles and mounting locations may be applicable. The system monitors for the presence and/or absence of fluid in a process line or pump. Under normal operating conditions the pipe will be full of fluid. The sensor will read a high capacitance. When the fluid level drops in the line, the capacitance will lower and the sensor will indicate an alarm condition. The control unit relay will switch to provide a visual alarm, signal a control system, or directly shut down a pump.

2.0 INSTALLATION

2.1 CONTROLLER

Examine the instrument for possible shipping damage. **IMPORTANT:** If for any reason it is determined that parts should be returned to the factory, please notify the nearest ARJAY Sales Representative prior to shipment.

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

2.2 SENSOR

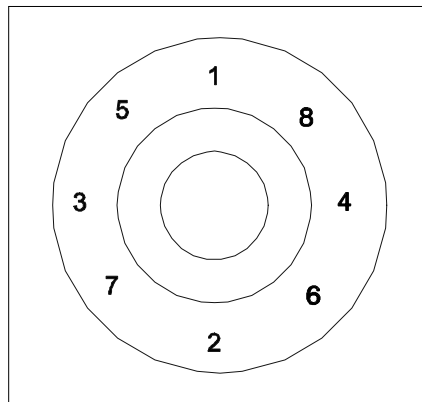
The ring flange sensor can be mounted in a vertical or horizontal position. Consideration must be given to the presence and absence of fluid during an alarm condition. If an upstream abnormal condition causes a lack of fluid supply to the pump, the sensor must be situated such that it will be affected by the lack of fluid directly within the sensor.

The ring flange sensor is designed in accordance with the ANSI ISO # sizing specifications. The sensor is constructed of PVC (alternate materials are available for specialty applications) and should be mated between raised flat faced flanges. Where specialty piping is used (ie. Victaulic) mount the sensor **ONLY** in accordance with manufacturers specifications.

2.3 INSTALLATION TIPS

Once the two mating flanges are joined to the pipe, the method for joining three flanges together is as follows:

1. Make sure that all the bolt holes of the matching flanges match up.
2. Insert all bolts
3. Make sure that the faces of the mating flanges are not separated by excessive distance prior to bolting down the flanges. Make sure the bolt holes align with mating flanges.
4. The bolts on the plastic flanges should be tightened by pulling down the nuts diametrically opposite each other using a torque wrench. Complete tightening should be accomplished in stages and the final torque values in the following table should be followed for the various sizes of flanges. Uniform stress across the flange will eliminate leaky gaskets.



*Based on using flat faced PVC flanges, a full face neoprene gasket, well lubricated hardware, tightening in the proper pattern and applying torque in small increments. For raised face flange assemblies, and PVC to metal flange (or other materials) the above torque recommendations may vary.

The sensor junction box is potted to the ring sensor. **DO NOT** attempt to re-align the sensor junction box as this will break the potted wiring and render the unit inoperable.

FLANGE SIZE (INCHES)	RECOMMENDED TORQUE (FT.LBS)*
1/2-1 1/2	15
2-4	30
6-8	50
10	70
12-24	100

3.0 START UP AND CALIBRATION

3.1 CONTROL AND FUNCTION SWITCHES

Set up the control and function switches as follows:

3.1.1 Failsafe

Put the selector in the "LOW FAILSAFE" position. This will keep the relay energized during a normal pump full situation. On alarm, the relay will de-energize. A power failure will also cause the relay to de-energize, signaling an alarm condition.

3.1.2 Time Delay

This will delay an alarm condition until the determined time has elapsed. By setting this to 10 seconds, the controller will shut the pump off after 10 seconds of a dry pump situation. Bubbles and air locks passing through the system will thereby be ignored.

3.1.3 Sensitivity

This selector switch determines the amount of fluid level change required to cause an alarm. Setting the switch to "1" will offer the greatest sensitivity

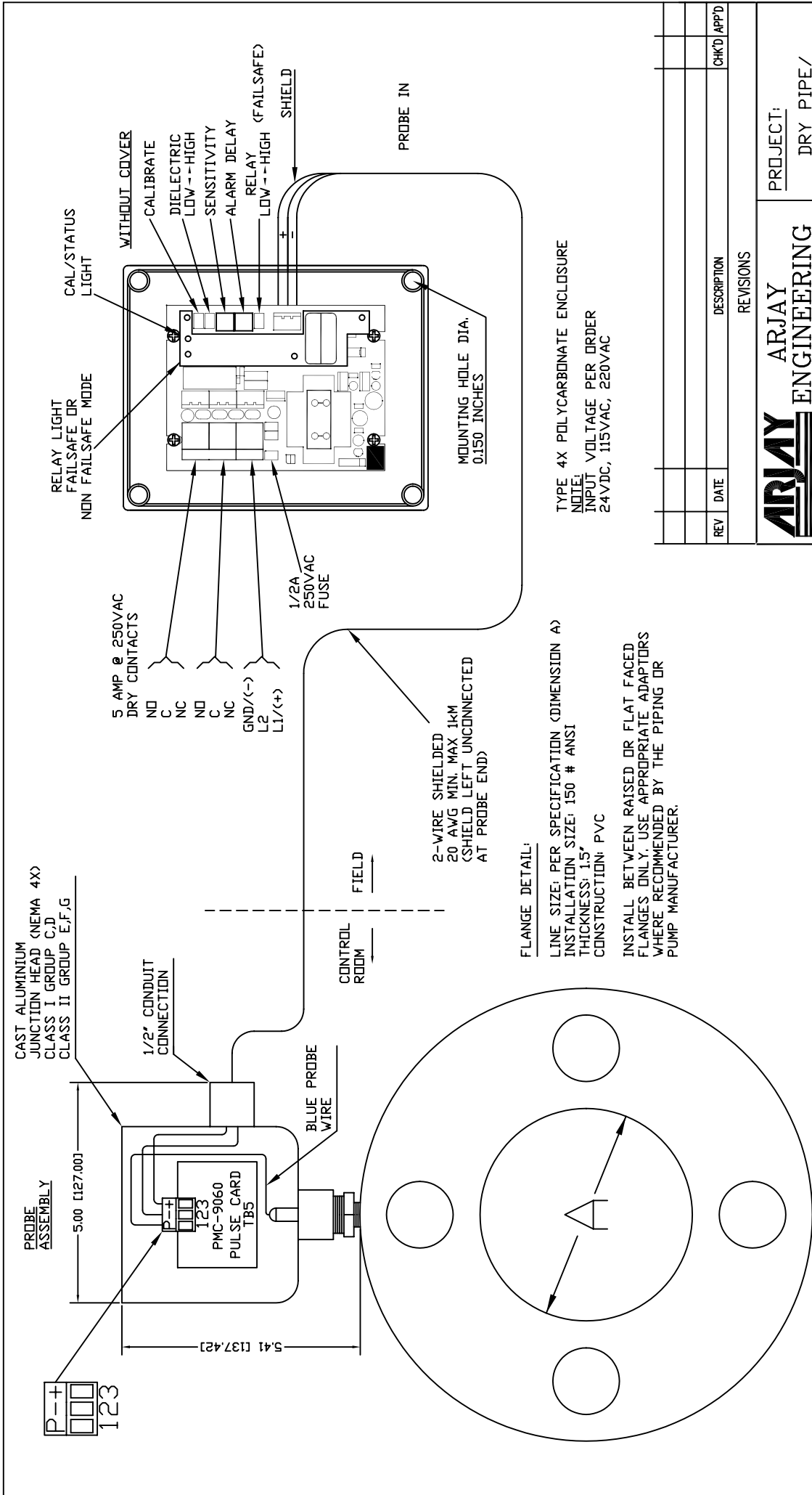
3.1.4 Dielectric

The dry pump monitor should be calibrated during a full pipe condition. The switch should be set to "HI" for this calibration.

3.2 CALIBRATION

With the unit wired as per the drawing, 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, verify the above function switch positions. With the pipe confirmed full, 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 causing the pipe to run dry within the sensor. NOTE: Closure of a local valve may not necessarily cause the pipe to run dry unless air is introduced into the line.



RING SENSOR
FRONT VIEW

DIMENSIONS ARE IN INCHES AND [mm's]
ENCLOSURE IS A VYNCKER 14322-50
ENCLOSURE DIMENSIONS ARE 7 X 7 X 4 (178 X 178 X 102)
ENCLOSURE MOUNTING DIMENSIONS ARE 6.2 X 6.2 (157.5 X 157.5)

FLANGE DETAIL:
LINE SIZE: PER SPECIFICATION (DIMENSION A)
INSTALLATION SIZE: 150 # ANSI
THICKNESS: 1.5"
CONSTRUCTION: PVC
INSTALL BETWEEN RAISED OR FLAT FACED FLANGES ONLY. USE APPROPRIATE ADAPTORS WHERE RECOMMENDED BY THE PIPING OR PUMP MANUFACTURER.

TYPE 4X POLYCARBONATE ENCLOSURE
NOTE:
INPUT VOLTAGE PER ORDER
24VDC, 115VAC, 220VAC

REV	DATE	DESCRIPTION	CHK'D	APP'D

REVIEWS		PROJECT:	

	ARJAY ENGINEERING LIMITED		PROJECT: DRY PIPE/ DRY PUMP MONITOR	
	DWG. STATUS DRAWN CHECKED APPROVED SCALE	BY C.P.	DATE 3/11/99	TITLE 9830-DPM DIMENSIONAL + ELECTRICAL
				SHT. 1
				REV. 0