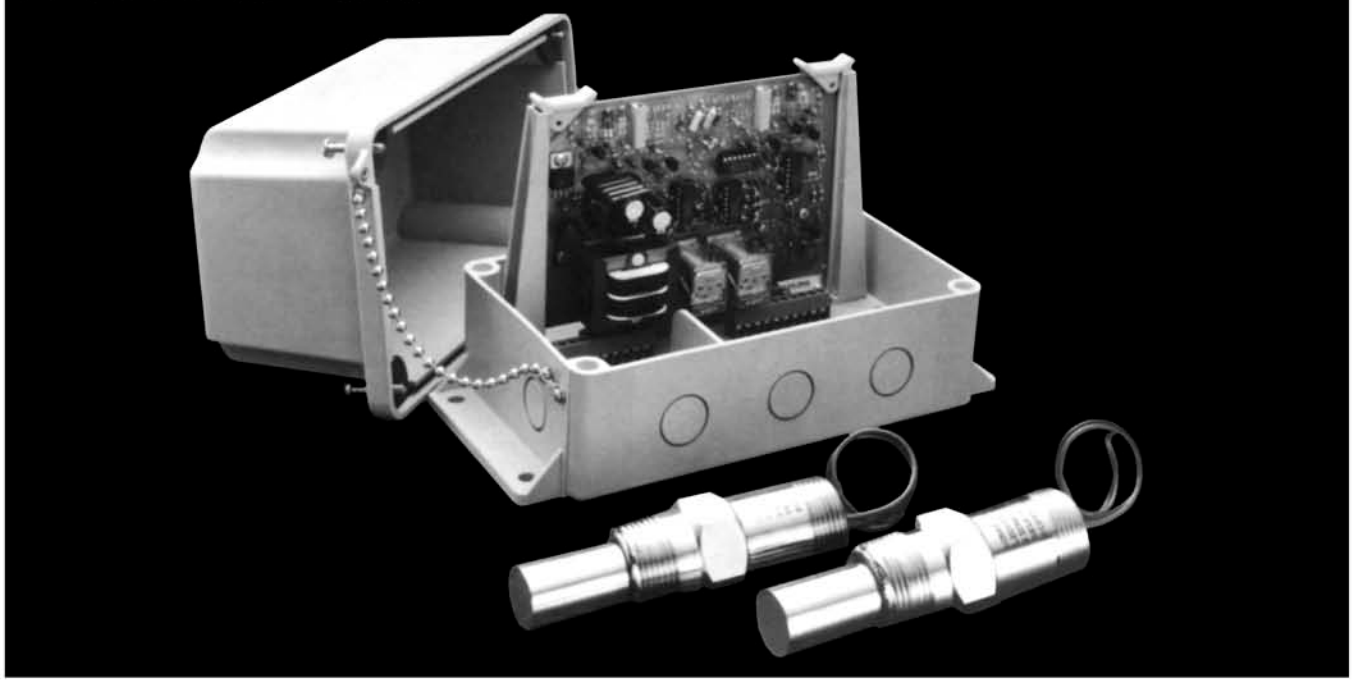
Sonac® 1000 2-Wire Switch

DATA SHEET
Liquid Level



FUNCTION

Single Point Switch for on-off control of liquids

TYPICAL USES

High Level Alarm or Control
Pump Control or Inlet Starvation Alarm
Flow/No Flow Indication
Low Level Alarm or Control

PRIMARY AREAS OF APPLICATION

Where liquids to be sensed constantly change physical or electrical properties. The **Sonac® 1000** principle of measurement can be used with extremely small vessels or pipes and when little or no intrusion into the process vessel is permitted.

The **Sonac® 1000,** when used with a computer or data logger, is an inexpensive and reliable method to sense liquid levels.

Fluids with foam blankets
The control ignores foam to indicate the true liquid level.

FEATURES

- **Two-wire transmission**
  The **Sonac® 1000** level switch is a true two-wire device powered from a remote power supply. It uses standard twisted pair wire.
- **Isolated output**
  The output circuit is isolated and above ground.
- **Fault indicator**
  When the Delavan model 920-2F power supply is used, a fault indicator feature maybe used to alarm on failure for critical service.
- **Non-dedicated vessels — liquids**
  The device senses virtually any liquid and does not need adjustment when the vessel contents are changed.
- **Intrinsic safety**
  Low energy at the sensor insures that the sensor can be mounted in hazardous areas with complete assurance, when used with appropriate intrinsic safety barriers.
- **Stable, dependable performance**
  This sensing technique provides a wet/dry ratio of 100:1 to provide dependable performance year in and out, without periodic adjustment.
- **No false trips due to surge or splashing liquids**
  Non-integrating time delays reset until sensor remains wet or dry for the total time period of one second.
- **Hermetically sealed**
  State-of-the-art electronics, hermetically sealed (potted) in sensor.
- **Fail-safe**
  The **Sonac® 1000** is designated high or low level fail-safe operation at the time of manufacture, and must be specified when ordering.
- **Non-intrusive**
  The sensor need not extend into the vessel beyond 1/4 inch. This feature permits installation in small vessels.
- **Rugged**
  The all stainless steel, heavy duty sensor resists damage from product abrasion or corrosion. No packing glands are used.
- **No field calibration**
  All sensors are 100% tested and calibrated for liquid service at time of manufacture. Factory calibration permits application to virtually any clean liquid, since the sensing principle depends only on the incompressibility of the process liquid.

PRINCIPLE OF OPERATION

The sensor is a magnetostrictive device consisting of a diaphragm, nickel tube, magnet, drive coil and pickup coil.

When 40kHz energy is applied to the drive coil, it causes the diaphragm to vibrate at a frequency determined by the mechanical resonant system of the sensor. Electrical energy is transferred to the pickup coil when the diaphragm is free to move in gas. When the diaphragm motion is loaded by a process liquid, less energy is transferred to the pickup coil.

The pickup coil of the sensor is connected to the input of an amplifier and the output of the amplifier to the drive coil to form a feedback loop circuit. Any energy appearing in the output of the sensor will be fed to the amplifier, amplified and returned to the input of the sensor. This causes oscillations at 40kHz to occur in the diaphragm. When the gain of the amplifier is adjusted so as to exceed the losses within the sensor, continuous oscillations are produced.

If the diaphragm of the sensor is exposed to a process liquid which offers mechanical resistance to the motion of the diaphragm, the transfer of energy to the pickup coil decreases. This results in a decrease in the signal feedback into the amplifier and a corresponding decrease in the signal available from the output of the amplifier. The decreased signal triggers a voltage sensitive network that controls the 4-20mA step change output current.

A change of state condition (sensor covered by liquid) will cause a step change in current in the output circuit. This can be used to operate a remote relay or develop a voltage that will indicate a change in level to a computer or data logging system. Multiple sensors can be operated from a single power supply.

The Delavan **Sonac® 1000** may be powered by the users 12 or 24 volt power supply or a Delavan 920-2F power supply with two control relays. The 920-2F provides a relay output with 1 Form C SPDT contacts, the power supply operates with a supply voltage of 115 or 230 Volts AC, 50-60Hz.

HOW TO ORDER

SONAC® 1001	High level fail-safe
SONAC® 1002	Low level fail-safe
Power Supply	By others or Delavan supplied dual units

SPECIFICATIONS — SENSOR

Supply Voltage	12 Volts DC at 20mA, 20 ohms 24 Volts DC at 20mA, 600 ohms
Power	Less than 1 volt-amperes
Time Delay	1 second fixed
Fail-Safe (4mA Nominal)	High Level Fail-Safe: power loss indicates wetted sensor **(Sonac® 1001)** Low Level Fail-Safe: power loss indicates dry sensor **(Sonac® 1002)**
Operating Temperature	-60°F to +160°F (-50°C to +75°C)
Output	4 or 20mA ± 2 (nominal) step change
Sensor Housing	Meets NEMA 4, 5, 12
347 Stainless Steel	NEC Class I, Groups C, D; Class E, F & G when installed in compliance with appropriate electrical code.

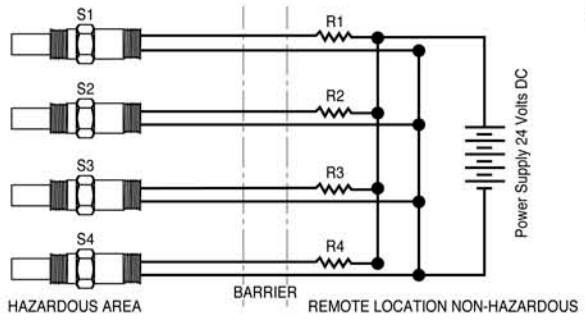
SPECIFICATIONS — DELAVAN MW/920-2F REMOTE POWER SUPPLY

with 2 Independent Relays (serves 2 sensors)

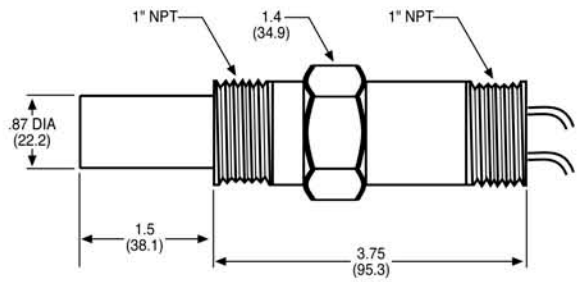
Supply Voltage	NOMINAL 115 Volts AC 230 Volts AC	ABSOLUTE LIMITS 90-135 Volts AC 180-270 Volts AC
Frequency	50-60 Hz	40 Hz minimum
Operating Temperature	-40°F to +160°F (-40°C to +75°C)	
Output Voltage	24 Volts DC at 40mA (Supplies two sensors) 2 Relays SPDT contacts 5 amp @ 120 Volts AC Non-inductive 3 amp @ 240 Volts AC Non-inductive 3 amp @ 24 Volts DC Non-inductive	
Indicators (one set per sensor)	RED LED - illuminated when sensor is wetted YELLOW LED - illuminated when relay is energized GREEN LED - illuminated, indicates no fault	
Housing Glass-Reinforced Polyester Enclosure, Stainless Steel Trim	Meets NEMA 4X	

Note: OEM or Rack mounted power supplies are available. Consult factory.

Typical Installation



Dimensions of Sonac® 1000



NOTE: DIMENSIONS IN PARENTHESES DENOTE MILLIMETERS

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