

Operating Instructions

For

Alarm Controls

Model NRALT Series
Capacitance Probe

NRALT Operation Instructions Rev. 1 Jan 01

Specifications are subject to change

NRALT LEVEL SWITCH

1. Note

Please read and take note of these operating instructions before unpacking and commissioning. The instruments may only be used, maintained and installed by qualified personal familiar with the operating instructions and the applicable health and safety requirements.

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3. Specific Features

- Micro – controller technology
- Push Button Calibration
- RF Technology
- Integral or Optional Remote Level Probe
- SPDT Relay Contacts
- LED Indication of Relay Status
- 0 – 30 Second Time Delay
- High or Low Relay Action
- No Moving Parts

4. Operating Principles

The switch senses level using a RF measurement technique together with micro-controller technology for high-resolution point level detection. The probe can either form a capacitor with the vessel wall or it can be supplied with a concentric shield around the probe for non-metallic vessels (ground reference). The capacitance of the configuration is measured by the NALRT and is used to provide point level switch control. The NALRT RF capacitance measurement technique combined with filtering algorithms minimizes the effects of coating and electrical noise on the probe and thus focuses only on the vessel capacitance.

The NRALT comes complete with an enclosure, transmitter and probe. The electronics are fully potted in the transmitter housing. The NRALT is also available with an optional remote probe, which may be located up to 100 m away. A variety of options including: stainless or PVC enclosures, bare or jacketed probes, NPT, sanitary or flange options are available.

Hi and Low alarms are set with the push buttons for differential level applications such as pump control. For single point applications, the high and low points can be set in the same manner.

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5: Instrument Inspection

Unpack the instrument carefully and inspect all components for damage. Notify an Almeg Controls Distributor as soon as possible if damage is suspected.

6: Mechanical Installation:

The NRALT level switch should be located for easy service access, calibration and monitoring. Sensor enclosure should not be exposed to ambient temperature below –40 deg. C or above 70 deg. C. Special precaution should be made to prevent exposure to corrosive atmosphere, excessive vibration, excessive shock or physical damage. It is preferable that the switch is not installed in proximity to high voltage wires or other sources of high electrical noise.

Capacitance probes may be selected from a variety of styles. For conductive liquids, such as water and acids, Usually Teflon coated probes are used. For non-conductive liquids, such as oils, diesel fuel and KEK solvents, usually bare stainless steel probes are used. In most granular materials, which are non-conductive and dry, bare stainless probes are used. The probe length is customer specified for the length.

CAUTION:

When installing sensors with Teflon or plastic coated probes, be careful not to damage the insulation. NPT threads are very sharp and insulation can be easily cut. In acidic and / or conductive liquids, damaged sensors may malfunction and the metal rods may corrode.

TO SCREW IN THE PROBE (threaded entry) USE A 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 with standing high pressures. Once opened, the unit cannot be reassembled without replacing the ferrules.

Probe Mounting Points to Consider:

A: Reference Ground:

Very important and is typically the tank wall that serves as a reference point.

IMPORTANT:

For standard thread entry and flange (without concentric shields) make sure the fittings are clean to ensure a *good electrical connection* between the probe head enclosure and the tank (Reference Ground). For horizontally mounted probes, the reference ground is not as important since the change in capacitance between alarm and no alarm is generally large. It is important that there are no moving objects in the probe vicinity to initiate false alarms.

B: Probe / Ground Distance

The distance between the probe and the ground distance applies to standard probes without concentric shields. The closer the distance to the tank wall, the greater the sensitivity of measurement; too close and bridging problems may occur.

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C: Horizontal Probe Mounting

A horizontally mounted rod type probe should be mounted so that the lower face of the probe is parallel to and at the leveled the desired alarm point. For viscous materials that have a tendency to cling to buildup, the probe should be mounted at a slight angle downward to allow the material to drain off the probe.

D: Vertical Mounted Probe

Vertically mounted rod type probe should be mounted so that its midpoint is at the desired alarm point for single point applications. This allows a greater variation if the alarm point is later required to be changed. The alarm point may be calibrated anywhere along the length of the probe.

E: Location

Avoid installing the rod type probes in nozzles or recesses where material can accumulate and give false readings.

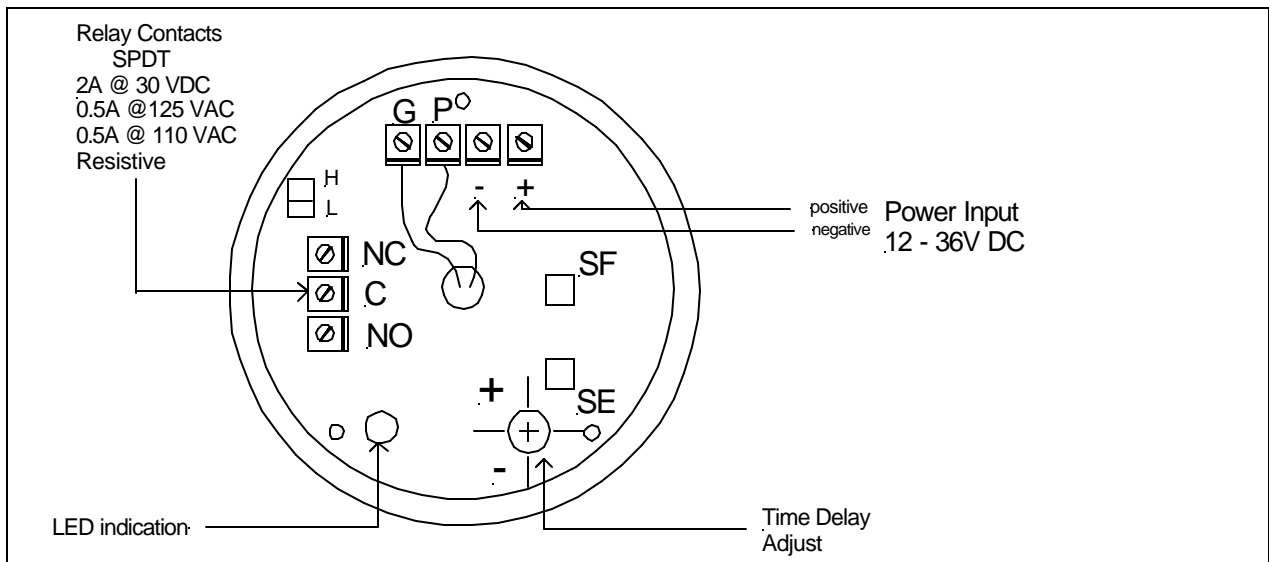
F: Measurement Accuracy

Accuracy is affected by the temperature change of the material in the tank. The amount of measurement error depends on the material. If the temperature change is excessive, temperature correction will be required. The probe must be calibrated at the ****normal running process temperature.**** Temperature changes the dielectric constant of the liquid.

G: Agitators or Moving Objects in the Tank

Moving objects in the tank close to the probe such as agitator blades, moving baffles etc. appear as moving ground reference s to a capacitance probe and will cause measurement errors. In applications where these objects are present, a concentrically shielded probe must be used.

7: Electrical Installation



NOTE: 12 – 36 VDC power is standard. For other power supply voltages, a power converter must be used. Applying power other than that meant for the unit may cause damage and or injury.

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7: Startup and Calibration

The type of probe and application determines calibration and switch settings.

- 1: Single point level switch using a vertical probe or a horizontal probe
- 2: Differential level switch using a vertical probe only.

After the switch has been installed as per installation procedure – power up the unit. The red LED may be off or on and is not valid until a successful calibration has been done.

The NRALT calibration procedures require that the level of the material in the vessel may be varied. For horizontal probes, proximity sensors and dry pump monitors application, the NRALT allows calibration requiring the probe to be completely immersed in material at the running temperature. For vertical probes, calibration should be done with the level at the desired alarm point.

A: Horizontal Installation:

- 1: Bring the level in the vessel below the probe.
- 2: Press SE (Set Empy) calibrate push button. The LED should flash once indicating that the calibration value has been stored.
- 3: raise the level in the vessel to completely cover the probe.
- 4: Press the SF (Set Full) calibrate push button. The LED should flash twice indicating that the calibration value has been stored.
- 5: This completes the procedure

B: Vertical Installation

- 1: Bring the level in the vessel below the probe.
- 2: Presses SE (Set Empty) calibrate push button. The LED should flash once indicating that the calibration value has been stored.
- 3: Raise the level in the vessel to the desired alarm point on the probe.
- 4: Press the SF (Set Full) calibrate push button. The LED should flash twice indicating that the calibration value has been stored.
- 5: This completes the procedure.

NOTE: Set the probe at normal running temperatures. Temperature change - will change the dielectric constant of the liquid.