HiTECH
Technologies, Inc.

GOOP-PROOF™

RF Point Level Switch

INSTRUCTION MANUAL

HiTECH Technologies Inc.

301 Oxford Valley Road
Yardley, PA 19067-7706
Tel: 215. 321. 6012 - Fax: 215. 321. 6067
Technical support: 800.755. 4507 or 888. NIVELCO
Email: info@hitechtech.com

1. Description

HiTECH's low-cost, GOOP-PROOF™ radio frequency (RF) point level control, designated the Model GP-2000, operates on a wide range of liquids, slurries and solid materials. Its Goop-Proof circuit design allows the GP-2000 to Ignore goopy build-up of any type on the sensing probe.

Operating on the RF Impedance sensing principle, HiTECH's GP-2000 will detect the presence (high level) or absence (low level) of virtually any material in any type of bin or tank. It may be made Fail-Safe In either high or low mode. The GP-2000 will operate In conjunction with process materials which range from low dielectric products such as refined oils to conductive slurries.

The GP-2000 is used in conjunction with a HiTECH GOOP-PROOF™ sensing probe. They are typically constructed from Teflon and 316 Stainless Steel and can function with high temperatures and pressures as well as being compatible with corrosive process materials.

2. Specifications

TYPE: Point level (on/off), radio frequency (RF), Impedance sensing

SENSITIVITY: Senses capacitance changes as low as 0.5 pF
Materials with dielectric constants as low as 1.5
Sensitivity can be decreased to 500 pF

AMBIENT TEMPERATURE RANGE: -40 to +150^0 F

TEMPERATURE STABILITY: Temperature coefficient of 0.025 pF/ F

RELAY CONTACTS: Two sets of form C (DPDT) contacts,
10 A 115 VAC or 26 VDC, resistive load

TIME DELAY: Field adjustable 0 to 30 second delay

FAIL-SAFE MODE: Field selectable - High or Low level

POWER REQUIREMENTS:

GP-2000	95 to 135 VAC, 50/60 Hz, 3 Watts.
GP-2000-24VDC	24VDC 20%, 1 Watt

ELECTRONIC HOUSING: Heavy-duty Cast Aluminum
Explosion-proof Housing
Class 1, Division 1, Group D;
Class II, Groups E, F, & G.

2) Time Delay

The GP-2000 Includes a, 0 - 30 second variable time delay in a delay turn-on/delay turn-off mode. This mode is typically used to prevent control relay 'chatter", or to Insure a given sequence of events during the control cycle.

Always begin with the delay control set to zero (full, counterclockwise position) When using delay to prevent relay chatter use-only the minimum amount required. Delay will result in process level overshooting or undershooting slightly about the control point, but the average % level will still be equal to the control point. Overshoot and undershoot are directly proportional to delay.

3) Fail-Safe Operation - Mode Select

Fall-Safe operation Is based on the fact that most major malfunctions, including a power failure, would cause the control relay to de-energize. Therefore, the de-energized state of the relay should relate to the so-called "alarm" condition. This means that If the external alarm had a different power source than the GP-2000, the alarm would sound for loss of power. The GP-2000 Is designed for Fall-Safe operation in both high and low level applications.

This action is controlled by a small programming jumper located near the center of the control panel (to the left of the time delay adjustment). The "H" position indicates Fail-Safe HIGH; the "L" position indicates Fall-Safe LOW.

6. PERFORMANCE GUARANTEE

Since 1986, every instrument sold by ***HiTECH*** has been guaranteed to perform in the application it originally was engineered and recommended for. Our company policy remains the same, every product sold comes with a **written performance guarantee**.

Should the equipment be unable to perform satisfactorily in your application and we are not able to correct the problem, we will accept the instrument in return and issue full credit.

This performance guarantee is valid for 60 days. Thereafter, our standard limited two years factory warranty goes into effect.

5. Operation

1) Sensitivity Adjustments

When making adjustments please note these general rules:

Clockwise rotation increases sensitivity for both controls.

A green PROBE STATUS light Indicates presence of material at the probe and a red light Indicates absence of material at probe, when both sensitivity controls are properly adjusted.Both procedures noted below apply to probes that are mounted vertically or horizontally.

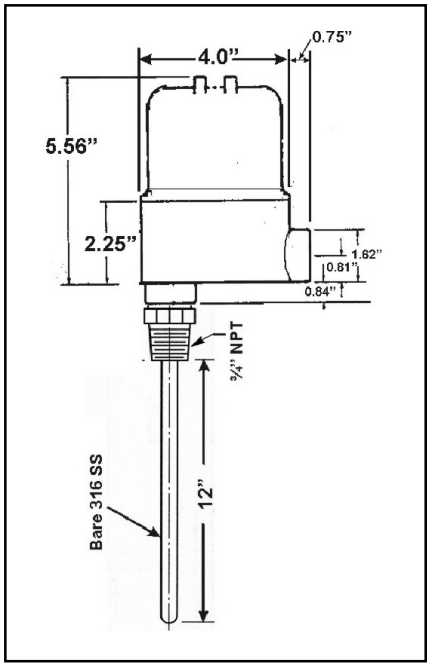
Apply power to equipment and allow a 5-minute warm-up for ensured stable operation. Proceed as follows after noting location of adjustments and indicator light.

a) For NON-AQUEOUS (non-water..) based , solutions.
Start with the vessel empty. Adjust FINE (F) SENSitivity control midway In its rotation. Next, slowly adjust the COARSE (C) SENSitivity until PROBE STATUS indicator light just switches to red. Readjust FINE (F) SENSitivity control slightly to find exact switch-to-red point. Mark the "empty' position. Next, cover probe with process material and readjust FINE (F) SENSitivity control (do NOT touch coarse) for an exact switch-to-green point and mark Its position. Note the difference between:the two marks and readjust the FINE (F) SENSitivity control half-way between marks. This completes the adjustment procedure. The difference noted above should be 20 degrees or more, (on Fine (F) control for proper operation. If less than 20 degrees, consult the factory.

To verify proper operation of non-aqueous process liquids, run process up vertically mounted probe. Trip point should occur halfway up. Trip should occur when horizontally mounted probe Is half covered.

b) For AQUEOUS (water) based solutions
Both adjustments should be turned to their full counterclockwise position, since aqueous liquids will always tend to trip at or near the tip of the sensor probe. This procedure also affords maximum coating Immunity. This completes the adjustment procedure.

3. Dimensions



4. Installation

1) Inspection

Carefully remove the probe and electronic housing from their packing and examine them for shipping damage. In particular, check the spring-loaded connection pin In the top side of the probe. This pin makes the connection from the probe's active element to the electronic circuit board. Also, verify that the unit and the power source are compatible. (i.e. 115 Volt unit, & 115 Volt power source).

2) Mounting

The probe is mounted by Its NPT hub (this Is standard), although a flange mount may be used. It may be mounted on a horizontal or vertical axis. For protrusion dimensions (beyond the outside of the bin or tank) see the case outline drawing above. To mount equipment screw NPT hub of probe into NPT mounting on wall (or top) of bin or tank. Next, screw the probe "head" (electronic housing) onto the top end of the probe. This is all the support it requires.

For flange mounting use appropriate gasket and/or sealing compound as required by the specific installation.

3) Electrical Connections

Before drawing wires into the equipment housing, board remove the electronic circuit assembly by unfastening the 8-32 screws and pulling the unit toward you. When the wires have been pulled through the wiring port, replace the electronic assembly with the “flat” side of the printed boards facing the wiring port. Terminal strip should be just in front of wiring port. Terminal strip will accept 12 to 30 AWG wire stripped to 0.25 Inches.

a) Line Powered Version;:(115 VAC or 230-VAC)
Connect the 115 VAC power line wires: Hot (H), Neutral (N) and Ground (G) respectively, to the terminal strip. If wires are not color coded with standard black, white, green colors, be very careful not to mix wires. Connect the control relay wires to terminal strip as indicated on the unit.

b) D.C. Powered Version (24V DC)
Connect the 24V DC power line wires: +24V (+), Com. (-), and Ground (G), if required, to the terminal strip. Connect the control relay wires to terminal strip as indicated on the unit.

c) Control Relay Connections
Two sets of Form C (DPDT) relay output contacts are provided on the GP-2000. They are rated at 10 Amps at 115 VAC for resistive loads. Although light duty (low inductance) solenoid valves or alarms should present no problem, heavy-duty Inductive loads must be actuated via a heavy-duty “slave” relay or contactor. Refer to SPECIFICATIONS section for detailed data on relay contacts.

4) Operation In Hazardous Areas

The enclosure for all models noted herein Is rated explosion-proof for Class 1 Division 1, Group D; Class 11, Division 1, Groups E, F, *&* G per the National Electric Code (NEC).

In order to take advantage of this rating, however, the use of certain wiring methods and materials must be satisfied. The outline which follows points out some of the major requirements of the NEC’s Section 501, as It relates to typical level control Installations.

W A R N I N G

For applications that must be explosion proof, it is the customer’s responsibility to install the required conduit, seals, wiring, etc., which meet national as well as applicable local and plant safety codes.

For Class I locations, rigid metal conduit must be used. At least five full threads of the conduit must be tightly engaged in the enclosure. Conduit seal fittings must also be used. These seal fittings must be filled with an approved sealing compound and must be Installed within IS Inches (or closer) of the enclosure. Conduit seals are also required when the conduit passes from a hazardous area into a non-hazardous area. Water drain seal fittings eliminate or minimize the effect of water that tends to collect In the conduit of enclosure due to condensation.

Approved wire type, such as mineral-insulated wire, is required for use In Division I Installations. Certain types of metal-clad cable or shielded nonmetallic-sheathed cable are permitted In Division 2 Installations.

When multi-conductor cables are used in the conduit, the outer jacket must be cut away In such a manner that allows the sealing compound to surround each insulated wire as well as the jacket.

The preceding information should act as a guide to assist the customer/ installer in satisfying their responsibility for producing safe installations In hazardous areas.