

Synalevel FS.1

The Synalevel FS.1 is a self-contained capacitance level control unit for fixed point high, low or intermediate level control. It is designed for operation in liquids or free flowing granular solids stored in hoppers, silos or other containers. Operation is direct from 115/240 volts 50/60Hz supplies, and the self-contained construction gives quick and easy installation and connection. The output on detection comprises a set of voltage free changeover contacts rated 5 amps 240 volts AC (non-inductive).

The unit comprises a weatherproof cast alloy enclosure fitted with a gasketed cover which houses the electronic circuitry, and a stainless steel sensing probe. The probe length is normally 30cms but other lengths can be supplied to special order. The probes can be specially sheathed in PVC or PTFE for operation in corrosive acids or chemicals. The complete probe is fitted into the container by means of a 1" BSP threaded nipple.

SPECIFICATION

Supply:	115/240 volts 50/60Hz (other supplies to special order).
Supply Tolerance:	-15% to +7½% about nominal.
Ambient Temp.:	-15°C to +50°C.
Sensitivity:	1 picofarad capacitance charge.
Output:	One set of voltage free changeover contacts rated 5 amps 240 volts A.C. (non-inductive).
Output Mode:	Output relay energised material present or not present set via slide selector switch.
Load:	5VA (excluding contact load)
Weight:	2.75 Kgs (30cm probe length)
Fixing:	1" BSP threaded nipple
Conduit Entry:	25mm tapped thread.

INSTALLATION

1. The Synalevel can be fitted in the side of the container at the required detection point or alternatively vertically mounted in the top of the container. When vertically mounted the tip of the probe should be at least 50mm into the material for reliable detection.
2. The unit can be wired in normal electrical cable, the connections being given on the chassis front plate. The contact state illustrated is with the relay de-energised and the contacts are voltage free.

CONTROLS AND INDICATORS

The Synalevel unit is fitted with the following controls and indicators:--

- Output Mode Selector** – A small slide selector switch at the top of the chassis plate which enables the output relay to be energised for material present or not present as required.
- Switch to 'FULL' – Relay energised material present.
- Switch to 'EMPTY' – Relay energised no material present.
- Output LED** – This red LED indicator illuminates when the output relay is in the energised state.
- Trim Control** – An adjustable trimmer capacitor which operates as a sensitivity control (see Commissioning below).
- Test Point Terminals** – Two projecting tags for meter connection to indicate the high/low deviation signal (see Commissioning below).

COMMISSIONING

Two methods of setting-up are given below. The first method is usually satisfactory but if difficulties are experienced (particularly where very light or dense materials are being detected) then Method 2 should be used. If in doubt it is best to use Method 2 as this will ensure optimum setting and reliability regardless of the material being detected.

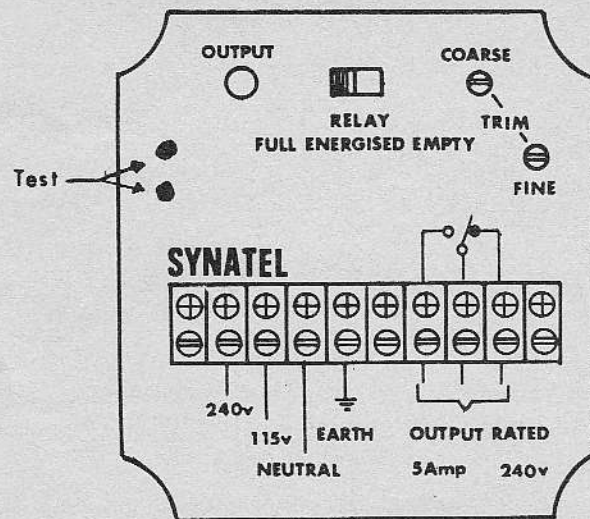
METHOD 1

1. Ensure the bin is empty and probe is clear of material.
2. Set Output Mode selector switch to 'FULL'. The output LED indicator may now be lit or unlit.
3. If the LED is unlit, slowly rotate the 'Trim' control clockwise until the indicator is lit then proceed as below.
4. Very slowly rotate the 'Trim' control anti-clockwise until the indicator goes out. The probe is now set critically at its operating point. In order to give a safe working margin turn the 'Trim' control very slowly about 1/10th of a turn further anti-clockwise.
5. Where 'sticky' materials are being detected which cause build-up on the probe it may be found that after setting-up as above the unit will not switch to the clear state when the level falls. If this occurs the 'Trim' control should be turned a further 1/10th turn anti-clockwise to give correct operation.
6. Set the Output Mode selector switch to give the required output relay state for the application.

METHOD 2

This method ensures optimum setting regardless of the material and requires the use of a moving coil meter with a sensitivity of around 50 microamps (1000 microamps = 1 milliamp).

1. Ensure the bin is empty and the probe is clear of material.
2. Set the Output Mode selector switch to the required position.
3. Connect the meter across the two test point terminals provided (+ of the meter to the lower terminal).
4. Adjust the 'Trim' control until a meter reading is obtained, and then carefully reduce the reading to zero. Take great care not to go below zero reading.
5. Fill the bin with material until the probe is covered. The meter reading should now increase.
6. Note the meter reading obtained then adjust the 'Trim' control until the reading is reduced by 50% (ie; half the bin full reading). If it is not possible to reduce the reading by 50% reduce it as much as possible within the range of the 'Trim' control.
7. Remove the meter and the unit is now set at optimum for reliable operation.



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SYNALEVEL FS.1

REVISED COMMISSIONING PROCEDURE

The Synalevel Self Contained Probe has now been substantially improved by the fitting of coarse and fine controls instead of the single control previously fitted.

This gives easier setting, allows the probe to operate in a greater range of material and in most cases, the unit can be set without the use of a multimeter.

The probe may now be commissioned as follows.

COMMISSIONING

It is possible to set up the Synalevel unit with the probe covered or uncovered and for difficult applications, test points are provided to allow a meter to be used to aid calibration.

In most cases, it is possible to set the probe in the uncovered state and without instruments. (Method 1)

METHOD 1. (Probe uncovered)

1. Ensure that the bin is empty and the probe is clear of material
2. Screw the fine trimmer clockwise until the trimmer is flush with the top plate and screw out (anti-clockwise) 4 full turns
3. Set the fail safe switch to "relay energise empty"
4. Rotate the coarse trimmer clockwise until the LED indicator is lit and then rotate the coarse trimmer anti-clockwise until the indicator is just unlit. This setting is fairly critical and the control may be rotated clockwise/anti-clockwise several times to determine the exact switching point.
5. Rotate the fine trimmer clockwise until the indicator is just lit and then a further full turn clockwise. The probe is now set for most materials.
6. In applications where very sticky or conductive materials are being detected, probe build up may necessitate further adjustment. In this eventuality, the above process should be repeated with the normal amount of probe build up present. The setting will be unaffected if build up is removed and re-adjustment is unnecessary.

METHOD 2. (Probe covered)

Where material is available, this method allows the probe to be set to the minimum sensitivity required by the actual material being monitored. If several materials may be fed into the same container, it is necessary to carry out the following setting for the lightest anticipated material.

1. Ensure that the probe is fully covered by material.
2. Rotate the fine trimmer until it is flush with the top plate of the unit.
3. Set the high/low level fail safe switch to relay energised empty.
4. Rotate the coarse trim control clockwise until the indicator is just illuminated. This process should be carried out slowly and carefully and may be repeated to determine the exact switching point. If the switching point cannot be found refer to 8.
5. Turn the fine control slowly anti-clockwise until the indicator is just unlit, plus one further full turn. (do not exceed 4 full turns)
6. If any difficulty is found in 5, repeat entire procedure.
7. The unit may be finely tuned by further adjustment of the fine trimmer. Clockwise rotation decreases sensitivity, anti-clockwise rotation increases sensitivity.
8. In a very few cases, the material may have a very high dielectric constant, taking it out of the range of adjustment of the coarse control. The probe will operate satisfactorily in these materials but guidance in setting up should be obtained from our application section.

METHOD 3. (Using multimeter)

This method ensures optimum setting regardless of the material and requires the use of a moving coil meter with a sensitivity of around 50 microamps (1000 microamps = 1 milliamp).

1. Ensure the bin is empty and the probe is clear of material
2. Set the Output Mode selector switch to the required position
3. Connect the meter across the two test point terminals provided (+ of the meter to the lower terminal).
4. Adjust the 'Trim' control until a meter reading is obtained, and then carefully reduce the reading to zero. Take great care not to go below zero reading.
5. Fill the bin with material until the probe is covered. The meter reading should now increase.
6. Note the meter reading obtained then adjust the 'Trim' control until the reading is reduced by 50% (ie; half the bin full reading). If it is not possible to reduce the reading by 50% reduce it as much as possible within the range of the 'Trim' control.
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