

The Magiflex Level Control System

Installation and Setting up Instructions

Principle of operation

The Magiflex probes are inserted into the vessel at the levels at which control or alarm is required. The sensitive tip of the plastic probe senses a change in capacitance when the material approaches or leaves the probe tip. This is amplified to activate the relay which has voltage free contacts, which may be used for alarm or control.

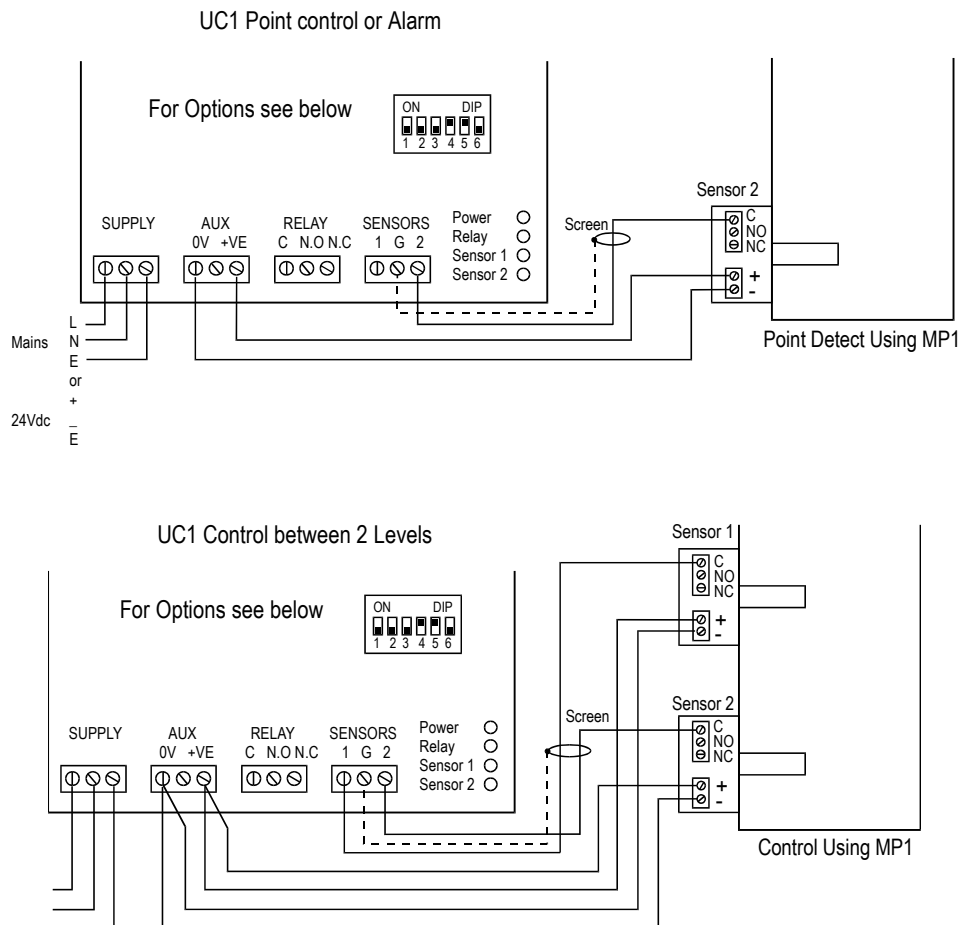
Sensitivity

The wide sensitivity range is set to suit the application, by means of a potentiometer & indicating LED situated in the termination head of the probe. When adjusting, avoid forcing the pot hard against the end stops.

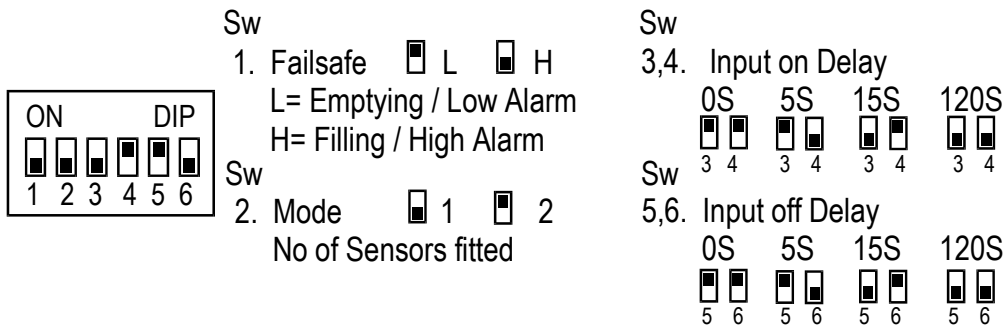
Fail Safe

The fail safe switch is situated inside the control unit. In general FSH is used for filling applications, and FSL for emptying applications.

Connection Details for Universal Controller UC1 : Wall mounted



Dip Switch Configuration for UC1



Guide to setting up

- H Fail Safe L Select 'L' if the relay is to be energised when the probe is covered, contact is closed (if using a volt free contact input i.e. float switch) etc.
 Select 'H' if the relay is to be de-energised when the probe is covered, contact is closed etc.
- 1 Mode 2 Select how many input sensors are being used, mode 1 single input, mode 2 dual sensor input.
 Mode 1 Select when only using one input sensor. The input sensor should be connected to input 2. Both sensor on and off delays, if selected, apply to input 2 in this mode.

Mode 2 Select when using two input sensors. Sensor 1 should be connected as the trigger, this is normally the higher sensing device in the vessel. Any on delay will act on this sensor. Sensor 2 should be connected as the latch, this is normally the lower sensing device in the vessel. Any off delay will act on this sensor.

Any off delay if selected will only be acknowledged after the sensor 1 becoming active and then de-active. On power up if sensor 2 is not active and an off delay is selected the output relay state will be inverse for the delay period.

3, 4. Input on Delay Select the time delay before recognition of a covered probe, closed volt free contacts etc.

5, 6. Input off delay Select the time delay before recognition of an uncovered probe, open volt free contact etc.

Dip Switch Time Delay Settings

Sensor On Delay (Dip Switch 3 & 4)

Selectable 0, 5, 15, 120 seconds (see dip switch instructions for configuration). Provides input sampling at approximately 500mS intervals, the input must be active throughout the period selected by the user. If at any time the input signal is invalid the timed period will be reset and no input acknowledged. Repeatability is 100%

Sensor Off Delay (Dip Switch 5 & 6)

Selectable 0, 5, 15, 120, seconds (see dip switch instructions for configuration). Provides a delay on the output relay changing state after the input calling for it to do so. This is non resettable. repeatability is 100%.

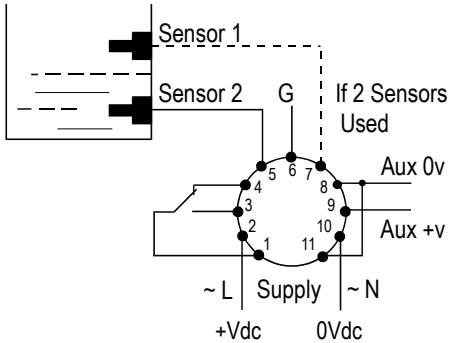
Setting the Fail Safe by Dip Switch No 1

Full fail to safe operation selectable via dip switch setting.
 The following table gives input/output states ignoring any delays.

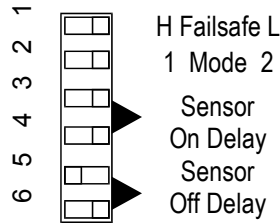
Input (volt)	Fail to Safe Low	Fail to Safe High
High +5V	Output Relay de-energised	Output Relay energised
Low 0V	Output Relay energised	Output Relay de-energised

Connection Details for Panel Mounting Universal Controller Type UC1/P

11 Pin Base Connections for UC1/P



Dip Switch/Timer Configurations for UC1/P



- 1 Fail to Safe Low or Fail to Safe High
 - 2 Single Sensor Operation or Dual Sensor Operation, for control
 - 3 Sensor On Delay
 - 4 Sensor On Delay
 - 5 Sensor Off Delay
 - 6 Sensor Off Delay
- 0s 5s 15s 120s

Technical Data for Universal Controllers

Supply: 230V/115V AC 50Hz
24V DC reverse polarity protected (selected at works)

Consumption: 0.35W @ 12V DC } all with no aux load
1W @ 24V DC }
5W @ 230V DC }

Inputs: Single sensor Input 2 Trigger
Twin sensor Sensor 2 latch, sensor 1 is trigger
Normally 5V DC
Active 0V DC

Max Input Resistance: 2,000 ohms

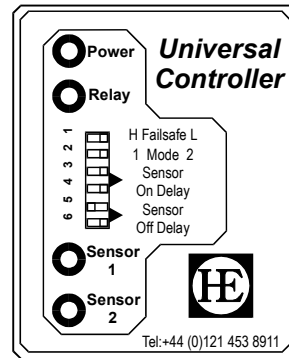
Outputs: Relay Volt Free
SPCO contacts 5A @ 230v resistive
LED'S
Yellow = Power On
Red = Relay Energised
Green = Sensor 1 Active
Green = Sensor 2 Active

Operating Temp: -10°C to +60°C

Enclosure
UC1/P: 50W x 61H x 75D 11 Pin Plug in Base connector 11 Pin relay
UC1: 130W x 170 H x 85D

Weight
UC1/P: 215 gms
UC1: 850 gms

Diagnostic: Flashing Input L.E.D.'s
Mode 2 - Input 2 u/s, incorrect wiring/connection or probes reversed
Mode 1 - Flashes if input is connected to input 1 & active
Fast flash 3 sec no timer options selected
Slow flash 1 sec in timing loop.



Two Models Available
UC1 Wall mounting,
UC1/P Panel mounting

Setting-up

Set the probes sensitivity for the material by the potentiometer (pot) & LED in the probe head

1. Single Probe covered by material applicable to all probes except MP7 & MP7/E

- 1.1 Ensure that the probe tip is in contact with the material.
- 1.2 Turn pot clockwise to max sensitivity (arrow opposite max) LED is off.
- 1.3 Turn pot anticlockwise LED will first glow & then come fully on when correct point is reached.
- 1.4 Turn pot back in clockwise direction until light goes out
- 1.5 Continue clockwise a further 3mm on the scale (1/8")
- 1.6 The probe is now set to an acceptable sensitivity for the material covering it. Further slight adjustment in either direction may be desirable in practise to optimise the setting.

2. Single Probe not covered by material

- 2.1 Ensure that the probe tip is not in close proximity to a metal or earthed surface so that it is sensing air to give it max sensitivity.
- 2.2 Turn pot to max sensitivity by turning clockwise (arrow opposite max) LED is off.
- 2.3 Turn pot slowly anticlockwise LED will first glow & then come fully on.
- 2.4 Continue turning pot anticlockwise a further 3mm (1/8") on the scale.
- 2.5 The probe is now set for max sensitivity & will probably operate above the surface of the material.
- 2.6 If this is too high, the sensitivity may be reduced by continuing to turn the pot anticlockwise.

3. Dual probe system for control between two levels. ensure low level probe is connected to sensor 2 high level probe is connected to sensor 1. Set fail safe switch FSL for emptying, FSH for filling.

- 3.1 For an empty vessel insert the low level probe & connect it to sensor 2 & when the material reaches it set as 1.
- 3.2 Remove this probe and insert the high level probe at the same level . Connect it to sensor 2 set up as 1 & 3.1.
- 3.3 Refit the probes in their correct positions & connect as 3.
- 3.4 If 3.2 is impractical it will be necessary to set the high & low level probes in their respective positions as the vessel is filled.

4. To set up a MP7 & MP7/E probe.

- 4.1 The MP7 is for free suspension & is supplied with straining wire. The MP7/E is for attaching to the end of a 3/4 BSP pipe. Both are prewired at works. The connections being Signal = Green/Yellow, Aux 0V = Brown Aux +V = Blue. When installing the MP7 ensure that the straining wire is shorter than the cable. It is generally not practical to set up these probes in their operating location or covered state. They may therefore be set up in the uncovered state, i.e. sensing air as in 2.
- 4.2 The probe is set at works with the pot fully anticlockwise & the LED illuminating.
- 4.3 With the probe held in free air with no object in close proximity to the tip, insert the trimmer tool supplied & turn the pot slowly clockwise until the LED is extinguished.
- 4.4 Turn the pot slowly anticlockwise until LED illuminates.
- 4.5 Continue turning 2 turns anticlockwise. The probe is now set for its max sensitivity.
- 4.6 Replace screw & O'ring & tighten.
- 4.7 If dust or material gradually builds up in the area of the probe tip it may be necessary to re-adjust the sensitivity so turning the pot anticlockwise until it ignores the build up. Don't forget to replace screws & O'ring.

5. Checking the Correct Operation

	Fail Safe Switch	Probe LED's Low Level	High Level	Motor/Pump Valve
5.1 Emptying	FSL			
5.11 Switch on		On	On	Stopped
5.12 Level rises to lower probe		Off	On	Stopped
5.13 Level rises to upper probe		Off	Off	Starts
5.14 Level falls below upper probe		Off	On	Running/Energised
5.15 Level reaches lower probe		On	On	Stops
5.2 Filling	FSH			
5.21 Switch on		On	On	Running/Energised
5.22 Level rises to lower probe		Off	On	Running/Energised
5.23 Level rises to upper probe		Off	Off	Stops
5.24 Level falls below upper probe		Off	On	Stopped/Energised
5.25 Level reaches lower probe		On	On	Starts

Typical Applications

Alum	Distilled Water	Molasses	Starch
Aggregates	Diesel Oil	Methylated Spirits	Sugar
Alcohol		Maize	Sawdust
Acetone	Edible Fats		Soda Ash
		Oats	Dry Salt
Bone Meal	Food Products		Sodium Carbonate
Black Nickel	Foundry Sand	P.F. Ash	Sulphur
Barley	Flour	Potato Chips	Sucrose
Bran	Fullers Earth	Petrol	
Bitumen	Fertilizer	Paraffin	Tea
Bread Crumbs	Frozen Vegetables	Perchloroethylene	Toluene
Benzene		Peat	Turpentine
	Glucose	Polypropylene & PVC	
Coal	Glacial Acetic Acid	Potatoes	Whiting
Cat Litter	Spent Grains	Peanuts	Wood Shavings
Cocoa Beans	Glycerine		Wheat
Coffee Beans	Gravel	Refractory Materials	Washing Powders
Cement			Whisky
Carbon Tetrachloride	Ice Cream Powder		
Creosote			Xylene
Chocolate	Lime		
	Limestone		
Ceramic Powders	Lubricating Oils		
Clay	Latex		

Guarantee



All Hawker products are covered by a 12 months guarantee against failure of components or faulty workmanship.
The period of guarantee commences 7 days after date of despatch or by special agreement, from date of commissioning.
Equipment returned for service under guarantee will be repaired by Hawker Electronics Limited free of labour and component charges, but subject to the following conditions:-

1. Equipment shall not have been tampered with in any way or subjected to misuse.
2. The guarantee does not cover pilot bulbs.
3. Postage and packing charges are applicable.

Warning

Before switching on mains supply to instrument & or control circuit, ensure that :-

1. Supply voltage corresponds to instrument voltage.
2. Control wiring is correct.

Failure to observe these precautions may result in damage to printed circuit boards, so invalidating our terms of agreement. Before disconnecting mains leads or control wiring at the terminal block, ensure that:-

3. Mains supply to the controller is switched off.
4. Mains supply to the equipment being controlled is switched off.

E.M.C. (Electromagnetic Compatibility)

Due to the nature of the Magicap Probe sensing circuit, it is possible that electromagnetic radiation applied to the probe tip can affect the switching of the probe. This effect is negated when the probe is mounted in an earthed vessel, or the source of radiation is not immediately adjacent to the probe (e.g. a mobile phone has no effect when more than 1 metre from the probe tip). No operational problems of an E.M.C. nature have been experienced throughout the "Magicap's & Magiflex's 25 year life.

Because of continuing development we reserve the right to change the specifications without notice.

For a full list of HAWKER products and application notes visit our web site at www.hawker-electronics.co.uk

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FM 10000

O&M 52
Issue C
May 03