



# TYPE P4 & P5 CONDUCTIVITY LEVEL CONTROLLER

## Installation & Setting up Instructions

### GENERAL

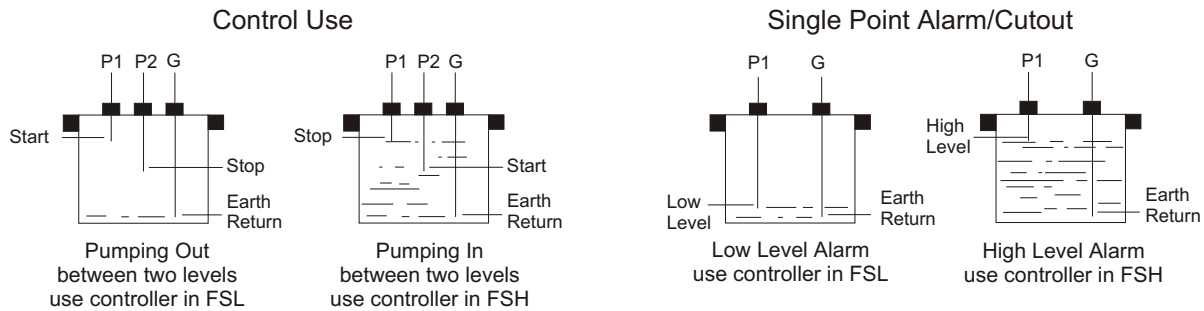
**Principle of Operation:** The P4 & P5 controller relies on the conducting properties of liquids to complete an electrical circuit between an electrode and earth. The earth is either the walls of a metal vessel, pipe work or another electrode which must extend below the lowest active electrode. A low voltage A.C. signal is used on the electrodes to prevent electrolysis.

**Sensitivity:** The sensitivity adjustment should be set to suit the application. This allows the level controller to ignore electrode bridging/foam layers and tracking, and only operate when the liquid touches or leaves the probe tip. To gain maximum

benefit from the adjustable sensitivity and close switching differential, always use an earth electrode.

**Fail Safe:** For P4 the fail safe switch is located on the front panel of the unit. In general for emptying applications, use fail to safe low (F.S.L.) and for filling applications use fail to safe high (F.S.H). The two green LED's on the the front panel indicate the fail to safe status. Use the end of a paperclip, or similar to change the fail safe. Switch 'IN' for F.S.H., Switch 'OUT' for F.S.L. For P5 the switch is internally located.

### OPERATION & APPLICATIONS



In fail safe high mode (FSH) the controller relay de-energises when the liquid touches the shortest electrode (e.g. pumping in or high level alarm).

In fail safe low mode (FSL) the controller relay energises when the liquid touches the shortest electrode.

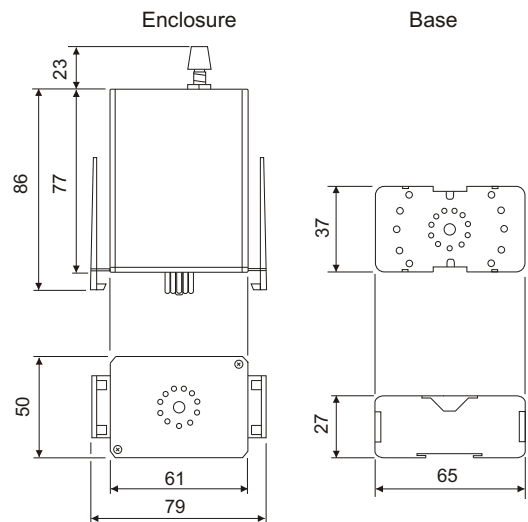
(e.g. pumping out or low level alarm). For control, two active electrodes are used.

The controllers internal relay energises at the tip of one electrode and de-energises at the tip of the other to provide the interlock shown in the diagram.

### TECHNICAL SPECIFICATIONS

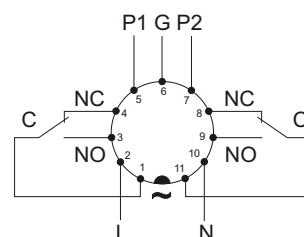
Supply Voltage:	Stated on instrument rating plate, 24, 48, 110, 230 VAC 50/60Hz available
Supply Tolerance:	+10% to -20%
Power Consumption:	5VA
Ambient Temperature:	-10°C to +60°C
Sensitivity: P4 P5	Adjustable 100 ohms to approx 18,000 ohm (approx 0 to 10 on dial) higher values up to 5000,000 ohms are available for higher purity water (ref Hi-Sen). 300 to 25,000 ohms adjustable.
Switching Differential: P4/P5	Better than 5% of sensitivity setting (eg less than 50 ohms at 1000 ohms sensitivity)
Relay Output:	Double pole changeover voltage free contacts rated 4A @ 250VAC resistive
Indication: P4 P5	Red L.E.D. showing relay contacts energised Green L.E.D.'s (2) Failsafe mode and power status. Red L.E.D. showing relay contacts energised
Connection:	11-pin DIN rail/surface mounting base.
Distance of Controller to Electrodes:	Nominally 100m but greater distance using standard cable are possible in liquids of high conductivity, such as acids, sewage, sea water, etc.
Reponse Time: P4 P5	0.5 Seconds 2 Seconds
Probe Voltage: P4 P5	24V AC 5V AC

### DIMENSIONS



### CONNECTION DETAILS

11 Pin Base, 2 C/O Contacts



# INSTALLATION

## Wiring Instructions

- Ensure load to be switched does not exceed contacts rating. If it does, fit an interposing relay or contactor.
- Avoid mineral insulated cable for probe connections, as this can absorb moisture giving a false signal.
- When two active electrodes are in use P1 is always the shortest.
- Keep electrode cabling away from conductors carrying high voltage and or current.

## SENSITIVITY ADJUSTMENT

### General Usage Set at 5

In general, for clean water and dirty water not containing suspended matter such as paper, weed, rag etc, the sensitivity should be set at 5.

### Risk of Ragging Set at between 0 & 2

Where there is the possibility of suspended matter, the unique circuitry of the Hawker series level controller enables a sensitivity setting to be found such that fouling and electrode bridging can be ignored. Here the sensitivity should be set as low as provides reliable operation. For sewage this can be as low as 2,1 or even 0 on the scale. Normally the setting is left 1/2 to 1 division above the switching point. (see below).

### High Purity Water Set Between 5 & 10

Sensitivity settings higher than 5 may be required for boiler feed water, spring water etc, or when the level sensing electrodes are within plastic stilling pipes, e.g. in borehole. Again a point 1/2 to 1 division higher than the switching point should be chosen, or such as to give reliable operation.

### Switching Point

With both active electrodes covered, turn the sensitivity pot clockwise to '10' now slowly rotate anti clockwise until the relay changes state, (to de-energise, light off, in F.S.L., to energise, light on, in F.S.H). This is the switching point. Advance 1 division for best sensitivity setting.

## FAULT FINDING

### Firstly check the obvious!

- Correct Supply ? and present at controller.
- Connections all secure and correct.
- Continuity of electrode cabling.

### To check controller operation:

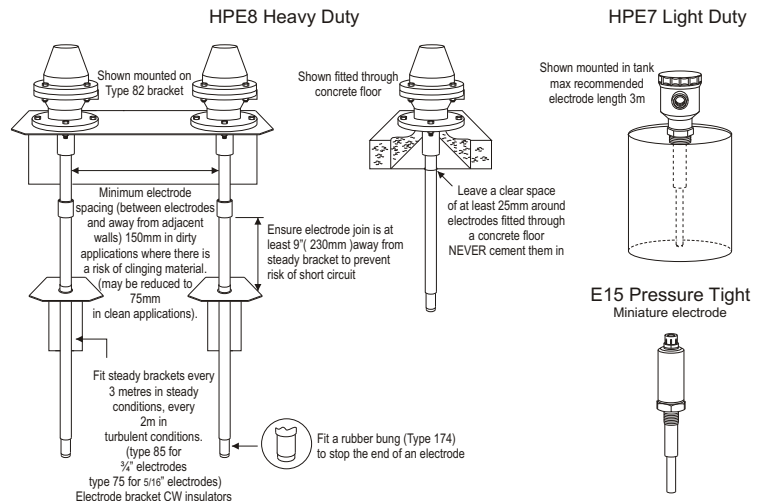
- Disconnect electrodes
- Short circuiting P1 to G should change relay state.

### To check interlock function in two electrode systems:

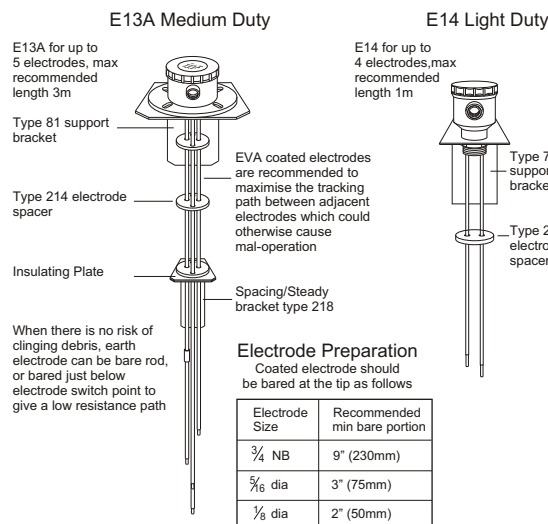
- Short circuit P2 to earth and hold.
- Short circuit P1 to earth, for F.S.H. controllers, relays should be de-energised and L.E.D. OFF. For F.S.L. controllers, relay should be energised and L.E.D. ON.
- Remove P1 short, relay state should remain unchanged.
- Remove P2 short, relay should change state.

## ELECTRODE INSTALLATION

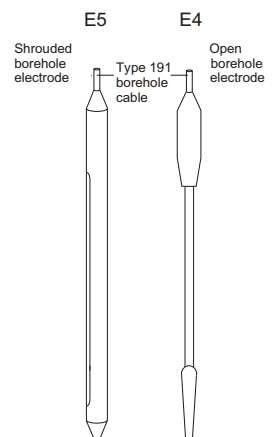
### Single Electrode Holders



### Multiprobe Electrode Holders



### Borehole Electrodes



## PROBE PROBLEMS

- If probes are covered but controller will not switch check sensitivity setting and that there is a good earth i.e. earth electrode has been sufficiently bared, and is close to active electrodes.
- Hunting around upper electrode (P1) means lower electrode (P2) is disconnected. (or is not fitted).
- Hunting around a lower probe often means (P1) and (P2) connections have been reversed.
- If controller runs on even when probes are uncovered, check for clinging debris, or other forms of short circuit. If necessary adjust sensitivity.

*This product has been designed and complies to the relevant standards as listed in its certificate of conformity. The installer/user must ensure system compliance Because of continuing development we reserve the right to change the specifications without notice*

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