



Automatic watering system C. B. Kemp

An annoying characteristic of most timed watering systems is that they water in the rain, hail or sunshine.

This system for shade houses monitors the moisture level in a sample pot. When the moisture level reaches a preset trigger level the watering system is turned on.

The circuit consists of a dual FET-input op-amp in which one is wired up as a simple relaxation oscillator. The output of the oscillator is applied across a voltage divider network comprising R4 and the moisture sensing electrodes. The voltage at the top of the electrodes is rectified by D1 and smoothed by the parallel C2/R5 network. This dc voltage is fed to the non-

inverting input of the second op-amp which is operated as a comparator.

The trigger level is adjusted by RV1 and this sets the moisture level at which the system turns on.

The comparator output is buffered by Q1 which drives the relay and the 'on' indicator LED. The relay contacts operate a 12 V dc solenoid valve and are protected from arcing by D3. The solenoid valve is a 12 V dc type obtained from Goyen Controls, 152 Ipswich Rd, Woolongabba Brisbane Qld. (07)391-4558.

The value of R4 that I have used seems to suit pots of 100-150 mm diameter using a standard commercial potting mix and

a slow-release fertiliser, 'Osmocote'. Because of the capacitance across the electrodes, a large value for R4 triangulates the oscillator waveform and lowers its peak value.

The electrodes are made from two pieces of blank copper-clad pc board with dimensions of 50 mm x 10 mm. Alternatively, the electrodes may be simply 50 mm off the ends of 7.5 A figure-8 cable which has been stripped of its insulation. As an ac voltage is applied across the electrodes corrosion is minimal. The electrodes that I use have been in a pot for at least five months with no appreciable sign of corrosion.

I placed one electrode horizontally across the bottom of the

pot — poking it through one of the drain holes. I positioned the other electrode vertically, down the side against the wall of the pot. This makes sure that the soil is moist from the top to the bottom, and not just across the top of the pot.

The plants are not adversely affected by the ac signal so it is best to use a pot containing a typical plant. Insert the electrodes, wet the soil to a reasonable degree, turn the wetness control until it just turns on and wind it back to turn it off. Put your sample pot in an average position and sit back, relax and watch it work. My plants have not looked back.