



## MICRO FEED

A high quality low cost high performance controller for feeding and acid dosing control. The controller is very easy to use having an LCD display, simple 3 key keypad and 'set' knob to allow setpoints to be changed.

The controller is built to the same very high standard as all other Tomtech computers. All equipment in the range is waterproof to IP54. As a result we are able to offer a full 2 year guarantee (providing the equipment has been installed and used in accordance with the instruction manual).

Programming is in plain English with all setpoints protected so that they are not lost if there is a power failure. The controllers have a clock with date and time, all programmed times may be 'Fixed' so that they remain the same each day or the controllers can adjust the individual times so that they track with sunrise or sunset. For example, if you want the dosing to commence the same period after sunrise each day then simply programme the time this is to occur today and select 'Sunrise time'. The controller will automatically change this time each day so that dosing always occurs the same time after sunrise.

It is easy to see what the controller is doing at all times, a 'Monitor Mode' uses the display to report all measured values, the time and current pH and conductivity targets. Lights on the front of the controller also show when dosing is active and when the pumps are dosing.

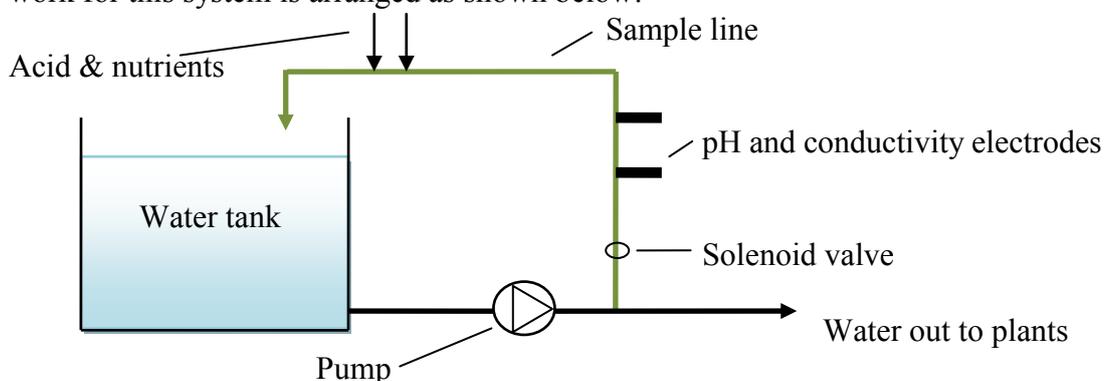
Installation is easy. The controllers are supplied with ready drilled cases and all glands and sensor cable needed. Two screwdrivers and a pair of wire cutters are the only tools required.

### Controlling Feeding and Acid Dosing

The Micro Feed will measure the pH - the acidity, and/or the conductivity of the water and control dosing pumps to add acid or nutrients to maintain the required feed mix. The system will typically be arranged in one of three ways.

#### Dosing Of A Stock Tank:

This is the best scheme when acid dosing alone is required and may be used with feed as well. The pipe work for this system is arranged as shown below:



A pump, which may be the main irrigation pump, is used to take water from the stock tank through a sample line where electrodes measure the pH and/or conductivity and return this water to the tank with acid and nutrients added. A solenoid valve may be fitted to control the flow of water along this line which can be controlled by the  $\mu$ Feed to allow dosing at certain times of day. The advantages of this system are:

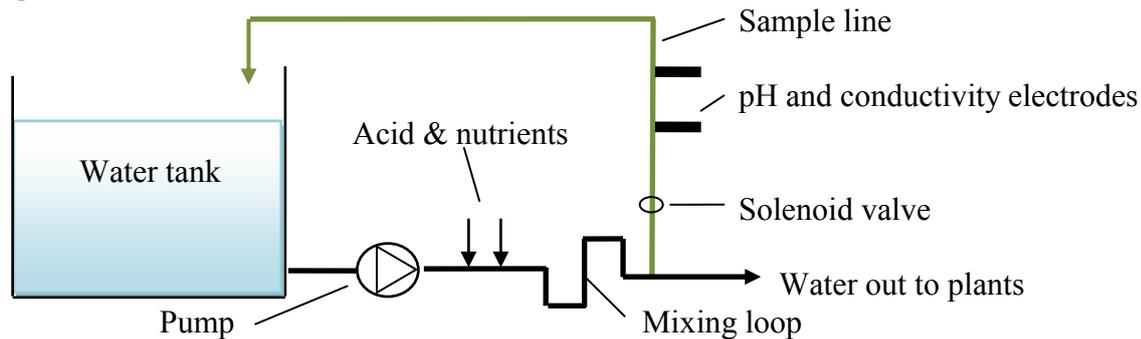
There is always a supply of treated water available.

The acid has time to react with carbonates.

The dosing pumps operate at low pressure and are therefore less expensive.

#### In-line Dosing:

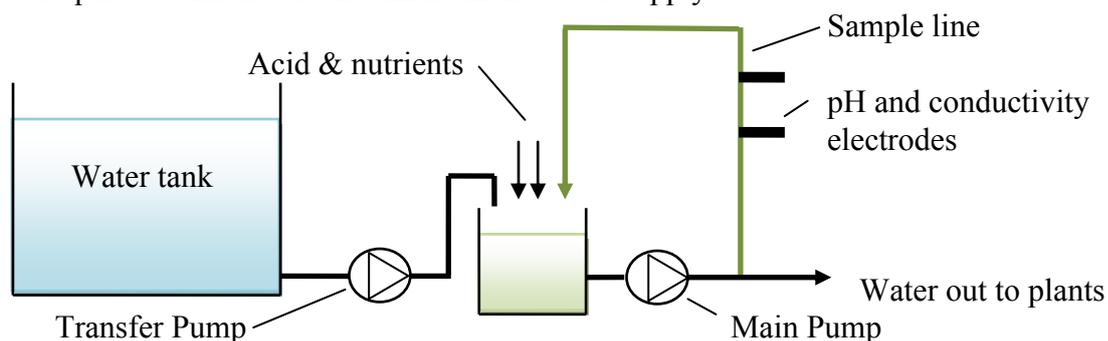
In this case acid and/or nutrients are added as water is applied to the crop. The system is typically arranged as follows:



The sample line is arranged to draw a small volume of treated water from the outgoing water main. This water is often returned to the water storage tank. This arrangement is preferable to siting the electrodes into the main water line as the pH electrodes will not work well at high pressures. High pressure dosing pumps are often required as acid and nutrients has to be injected into the water line. A mixing loop is located between the injection point and the sampling point to ensure nutrient mixing is completed.

#### In-line Dosing With Break Tank:

The mixing loop is replaced with a small volume break tank. In this case an extra water transfer pump may be required to fill the break tank from the water supply.



This scheme can use low pressure dosing pumps and does not return the sample water to the water storage tank. Nutrients and acid are mixed in the break tank by returning water via the sample line.

#### Micro Feed Setpoints

The Micro Feed may be used with any of the schemes shown above. Setpoints allow dosing to be triggered either by time or from an external input. The external input is used when in-line dosing is to be started from an irrigation sequencer.

Target pH and conductivity values may be programmed. The target conductivity can be varied with light intensity by connecting a light sensor to the Micro Feed. Up to two nutrient pumps and an acid pump may be used. The ratio of the two nutrient pumps can be varied to allow the recipe to be easily changed without altering the concentrate.

The Micro Feed has inputs for one conductivity sensor and two pH sensors. Two pH sensors are recommended as these electrodes can fail without warning and it is very important to avoid over-dosing with acid. The Micro Feed may be programmed with a maximum variation between the two electrodes. If this value is exceeded then dosing will stop.

### **Measuring pH and Conductivity**

The Micro has standard 4-20mA inputs for measuring conductivity and pH. The pH and conductivity electrodes connect to the Micro Feed via special monitors which condition the electrode signals.. These provide a display of the current measured values, a means of calibrating the electrodes and high and low programmable alarms.

For the pH electrode a PHM2 (or earlier PHM1) is used with each electrode. For conductivity an ECM2 (or earlier ECM1) is used. These units are housed in similar waterproof enclosures to the Micro Feed.

### **Using A Light Sensor**

A Tomtech LS1 light sensor can be connected directly to the Micro Feed allowing the target conductivity to be varied with light intensity. This is ideal for growing on rock wool or similar substrates where the conductivity will typically be reduced in very bright conditions.

### **Micro Feed Outputs**

The Micro Feed has outputs for connection to two nutrient and an acid pump. These connections via volt free N/O relay contacts that share a common connection. They are designed to be used with pulsed pumps such as the Tomtech PDP101 (22 litre/hr) and M150x (96 litre/hr) peristaltic nutrient pumps. The HVDF and DXF diaphragm pumps have PTFE and Viton parts and are ideal for acid (60% nitric acid).

The Micro Feed has an 'ACTIVE' output with change over volt free contacts that switches when dosing starts. This is designed to be used to switch on external equipment such as a sample line solenoid valve or circulation pump.