

# pH Control-480

Select dosing system - 480



## Instructions for Use

Ref: 1 Dec 06

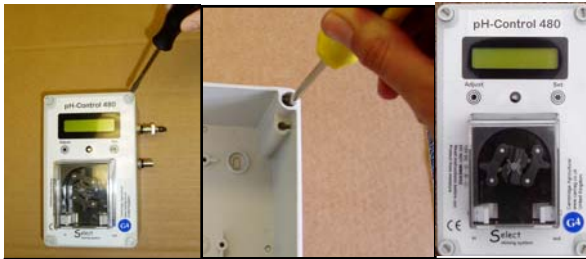
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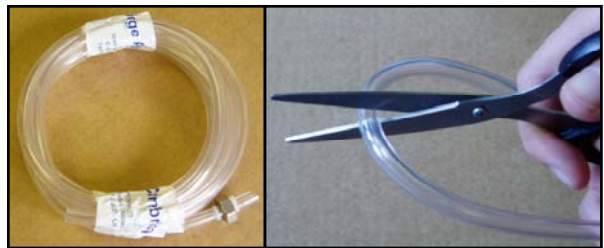
Featuring G4 programming

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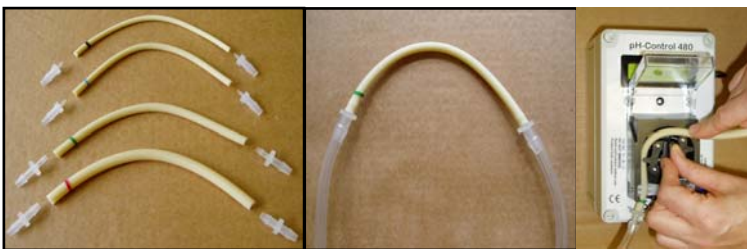
### Quick Guide



Remove the cover of the pH Control Doser. Mount the doser base in a convenient position. Replace cover.



Unpack the 3m delivery tube. Cut the tube to appropriate lengths to suit suction from product stock container, and delivery to



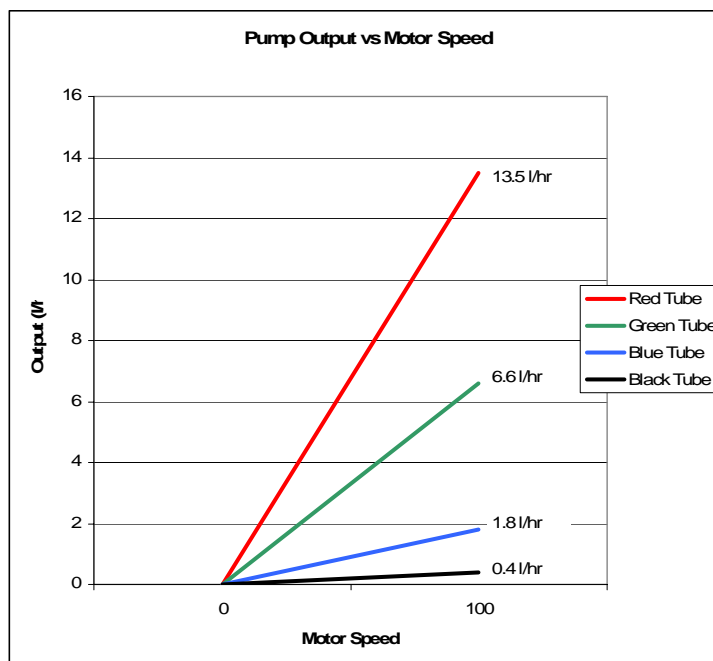
Unpack the pump tubes. The tube colour to use is dictated by the rate the product is to be dosed (see Instructions for Use). Insert the tube connectors in each end of the pump tube, then into the two sections of cut delivery tube. Install the pump tube in the pH Control Doser, working from left to right (turning the rotor by hand). Ensure the tube is held by the white clamps and seated evenly.



Connect the power supply and pH sensor cable to the doser



Follow the on-screen instructions for dosing.



### Description

The pH-Control dosing system is a peristaltic pump designed to maintain a chosen pH level. Pumps are available to:

1. Increase or decrease the pH of a bulk liquid to a chosen pH level by the addition of either an alkali or an acid depending on the normal pH level of the bulk liquid.
2. Maintain a bulk liquid within a chosen pH range by the addition of either an acid or alkali (double pump-head version)

There are no user serviceable parts inside the PH Control doser.

### Chemical Compatibility

Peristaltic pumps have the benefit that there is no contact between the dosed product and the pump mechanism. It is, though, advisable to check that there is good chemical compatibility between the pump tube and the dosed product. For commonly dosed products contact Dosing Solutions or the supplier of this equipment. For less common products, soaking a small section of pump tube in a sample of the dosed liquid for 48 hours should be sufficient. If no change in dimensions or appearance of the tube is detected after soaking, then the pump tube is compatible with the dosed product. Note: It is not normally possible to dose oil based products through a peristaltic pump using standard pump tubes.

### Changing Pump Tubes

The wearing part of a peristaltic pump is the pump tube. Changing the pump tube regularly (monthly to begin with) will ensure trouble free dosing. Failure to change pump tubes will result in the tube splitting and causing the pumped product to spill.

ENSURE EITHER THE POWER SUPPLY IS DISCONNECTED BEFORE CHANGING  
THE PUMP TUBE.  
OTHERWISE ROTOR TURNING IS POSSIBLE

Removal of pump tube - Open the clear Perspex pump head cover. Unclip the pump tube at the inlet. Lift out the pump tube whilst rotating the pump rotor by hand in a clockwise direction. When the pump tube is clear of the rotors, unclip the pump tube at the outlet.

Installing new pump tube – clip the pump tube into the white retaining clip near to the inlet position leaving approx 5mm (1/4 inch) clear of the clip. Whilst turning the pump rotor by hand in a clockwise direction, feed in the pump tube between the rotors and the pump housing. Finally clip the free end of the pump tube into the white clip at the outlet position. Close clear Perspex cover before use.

Ensure that all connectors between the pump tube and delivery tubes are securely fitted. If necessary warm the delivery tube with warm water to soften it to make fitting more easy.

### Pump Tube Life

The life of the pump tube will depend on many factors including the product being dosed, the back pressures under which the pump is working, and the amount of time the pump needs to run to perform correctly. It is suggested that, in order to maintain dosing accuracy, the pump tube is replaced on a MONTHLY BASIS or sooner if wear or disfiguration of the tube is apparent. Spare tubes are available from your pump supplier. Note: Only tubes supplied by Dosing Solutions Ltd are recommended for use in the pH-Control dosing system to ensure accuracy of operation and longevity of the pump.

### Safety

The PH Control doser is an extremely safe unit. However, the following points should be observed:

Normal electrical safety precautions apply. Avoid water contact with any pump parts apart from the pump tube in normal working. Do not immerse the pH-Control doser.

Take precautions to ensure the pH-Control doser can not fall into liquid tanks. Consider extra tethering if necessary. If immersion does happen accidentally, isolate the pH-Control Doser from the electrical supply immediately.

The use of safety circuit breakers is recommended. If in doubt seek advice from a qualified electrician.

### Accuracy

The pH Control doser is factory set to give accurate dosing. However, accuracy will depend on regular calibration of the pH probe using fresh buffer solutions.

### Electrical Supply

The PH Control doser uses a 12V DC power supply. This can either be supplied from a 12V battery or via a transformer power supply from the mains electricity supply.

A 1.0 – 1.5A maximum current power supply is recommended. The pH-Control doser normally runs below 500mA although starting currents are larger and dependant on the pumping conditions encountered.

### Options

#### Calibration

Accuracy of dosing depends on regular calibration of the pH probe. Although high quality probes are supplied with the pH-Control doser that should hold their calibration for several months, it is advisable to calibrate the probe frequently depending on the level of accuracy required.

Use only fresh buffer solutions for calibration.

From the Welcome Screen, go to Options **press Set** and Calibrate **press Set**

PH Control	
Start	Options
Adjust	<b>Set</b>

PH Control	
Start	Calibrate
Adjust	<b>Set</b>

Calibrate Y/N ?	
No	Yes
Adjust	<b>Set</b>

Calibration	
Use B4	Cont.
Adjust	<b>Set</b>

Insert the pH electrode into pH 4.0 buffer solution before pressing "Cont." The following screen will appear whilst the electrode is being calibrated against the pH 4.0 buffer solution:

Calibration	
Use B4	Wait.....
Adjust	Set

Calibration	
Use B7	Cont.
Adjust	Set

Insert the pH electrode into pH 7.0 buffer solution before pressing "Cont." The following screen will appear whilst the electrode is being calibrated against the pH 7.0 buffer solution:

Calibration	
Use B7	Wait.....
Adjust	Set

Once the pH 7.0 calibration is complete, the next screen to be shown is the Welcome Screen.

#### Target pH

From the Welcome Screen, press "Options" (Calibrate will be shown), press "Adjust" and "Set Target pH" will be shown. Press "Set".

Press "Adjust" to scroll through pH values from 1.0 to 13.9. Choose the pH value:

Set target pH	
7.7	
Adjust	Set

When the desired value is shown, press "Set".

#### Acid or Alkali Dosing (Mode)

From the Welcome Screen, press "Options" (Calibrate will be shown), press "Adjust" and "Set Target pH" will be shown. Press "Adjust" and Set Mode option will be shown. Press "Set".

The pH Control doser needs to be set to either:

- Dose alkali into a normally acid bulk liquid. This is termed **Active Low** as the pump will be active when the pH in the bulk liquid is lower than the Target pH.
- Or to dose acid into a normally alkali bulk liquid. This is termed Active High as the pump will be active when the pH in the bulk liquid is higher than the Target pH.

Set Mode	
Active low	
Adjust	Set

Press Adjust to display either "Active Low" or Active High", then press Set to select the Mode required.

#### Pump Speed

The rate of pumping of the pH-Control doser to return a bulk liquid to the desired pH will be determined by the specific requirements of the process. Output graphs for each of the 4 coloured pump tubes are shown below and in the Quick Guide on Page 2. In order to maximise the life of the pump motor as far as possible, select a tube colour so that a motor speed of between 20% and 80% can be used.

If a pumping rate of greater than 13.5 litres per hour is required the pH-Control 800 Series pump is available with pumping rates available up to 90 litres per hour. Consult your Distributor.

From the Welcome Screen, press "Options" (Calibrate will be shown), press "Adjust" (Set Target pH) will be shown, press "Adjust" (Set Mode option will be shown), press "Adjust and "Set Pump Speed" option will be shown. Press "Set":

Set Motor Speed
50%

Adjust

Set

Press "Adjust" to select the motor speed required. Then press "Set". The Welcome Screen will be shown. Note: the motor speed can be set between 20% and 100%. Less than 20% is not available to prevent the motor stalling.

The following chart gives the output of the pump when the motor is running at 100% speed. The output also varies with the colour pump tube fitted.

Pump Tube Colour	Priming pump rate
Red	13.5 litres / hour
Green	6.6 litres / hour
Blue	1.78 litres / hour
Black	405 ml/hr

The output graph is shown in the Quick Guide on Page 2.

#### Operation

Press "Start" from the Welcome Screen.

If the Active Low operating mode has been chosen, the screen will look similar to:

PH Control
7.1                      <                      7.5

Adjust

Set

The Target pH is 7.5. The actual pH detected by the pH probe is 7.1. Therefore the pump motor will be running. The inlet to the pump should be in an alkali product to increase the pH of the bulk liquid. When the pH of the bulk liquid reaches the target pH, the pump will stop. The Actual pH will continue to be monitored so that the pump can start pumping again when the pH drops below the Target pH (in fact it will start pumping again when the pH drops to 7.3 to avoid the hysteresis effect).

If the Active High operating mode is selected, the screen will look similar to:

PH Control
6.8                      >                      7.5

Adjust

Set

The Target pH is 7.5. The actual pH detected by the electrode is 6.8. The Mode is chosen as Active High, the motor will only run when the pH detected by the electrode is higher than the Target pH, therefore the motor will not be running in this case.

When the pH of the bulk liquid rises above 7.5 the pump will start to run and acid should be dosed to reduce the pH of the bulk liquid to below 7.5.

### Water Line Pressure

The pH-Control doser will operate against a water pressure in the drinking line of up to 2 bar. (2 bar = 28psi = 66ft H<sub>2</sub>O = 20.4m H<sub>2</sub>O). Fit a pressure reduction device if necessary. If it is possible to dose at atmospheric pressure the tube life will be considerably extended.

### Rotor Adjustment

The rotors in the pH-Control pump head are sprung and designed to give maximum operating pressure whilst preserving tube life as much as possible. The rotor should not need adjustment, but exceptionally small variations in pump tube dimensions might lead to the rotor either not turning or turning too easily and not fully occluding the pump tube.

**ENSURE EITHER THE PUMP IS DISCONNECTED FROM THE POWER SUPPLY BEFORE MAKING ADJUSTMENTS TO THE ROTOR**

Should the rotor not turn against the pump tube (particularly after fitting a new pump tube) screw in the cross head screws on either side of the rotor by no more than 1/8 turn and equally for both rotors. Test if the rotor turns freely (by running the pump) and repeat the tightening process if necessary. If the screws are tightened too much the pump tube will not be fully occluded and the pump will not perform correctly.

If the pump is showing signs of not sucking up product from the product container, or not being able to pump up to 2 bar pressure, it is possible the rotor adjustment screws might need to be loosened. Adjust each screw equally and by no more than 1/8 turn before re-testing the pump. If the screws are over-loosened the rotor will not turn against the pump tube.

In case of difficulty, consult your supplier.

### Installation

The PH Control doser can be powered from a 12V DC battery or via a transformer from the mains electricity supply. Position the doser so as to be convenient for both a power source if power is to be taken via a transformer from the mains, and to the bulk liquid to be treated. Ensure that the pH-Control doser is properly secured to prevent it becoming immersed in water or stock additive solution.

Note: The pump will self prime. The pump can also be run dry without damaging any parts although it is not recommended to run the pump dry for extended periods.

Consider wiring the power supply for the doser so that the doser is activated when a circulation pump is also active. This may prevent dosed product collecting in a concentrated area without proper mixing.

It is also possible to link the pH-Control doser to other sensing devices (e.g. a float switch) to ensure the doser only functions when other criteria (e.g. tank level) are correct.

### Pumping Problems / Errors

If the pH-Control doser fails to operate correctly, check the following: (If the problem can not be resolved contact your Distributor)

<b>Problem</b>	<b>Solution</b>
Rotor jamming against the pump tube.	Tighten cross-head adjustment screws on rotor as described in the section "Rotor Adjustment" above.
Product not being pumped from stock container.	<ol style="list-style-type: none"> <li>1. Check all tube connections are firmly in place.</li> <li>2. Pump rotor may not be fully occluding the pump tube. Release cross-head adjustment screws on rotor as described in the section "Rotor Adjustment" above. (See "pressure loss" below)</li> <li>3. Inlet tube could be blocked. Clear as necessary.</li> <li>4. tube connector on the suction side of the pump tube could be damaged allowing air to be sucked in. Replace tube connector.</li> </ol>
Sudden loss of pumping pressure (with possible return of fluid into stock container)	<ol style="list-style-type: none"> <li>1. Check if there is any lateral movement in the rotor. It is possible the rotor shaft bearings may have worn. Consult Distributor.</li> <li>2. Check for physical damage to pump head fixing screws. If the pump head is loose, pressure will be lost. <b>DO NOT OVER-TIGHTEN FIXING SCREW</b></li> <li>3. If non-return valve is fitted into delivery line, check that it is functioning correctly.</li> </ol>

Dosing does not commence	<ol style="list-style-type: none"> <li>1. Is power supply sufficient? Connected</li> <li>2. Is the correct Mode selected?</li> <li>3. Is the electrode connected?</li> </ol>
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### Maintenance

#### **Weekly**

Inspect the pump tube for signs of wear.

Check doser output. Adjust as necessary via the control screen.

#### **Monthly**

Replace pump tube monthly or sooner if any of the following occur:

- Sharply increased rate of dosing
- Split tube

#### **Each 6 Months**

After disconnecting from electric supply, remove cover from pH-Control doser and inspect interior of pump enclosure. Ensure no ingress of moisture or other contaminant. In case of difficulty, contact your supplier.

There are no user-serviceable parts within the pHControl doser case. Any maintenance of working parts within the case should be carried out by an authorised service agent of Dosing Solutions Ltd

### Spare Parts and Accessories

Item		Code
pH-Control doser 480	Unit	700CA48
pH-Control doser 800	Unit	700CA80
pH electrode	Unit	710CA00
pH electrode extension lead	Unit	710CA05
Replacement pump tube pack – 10 tubes	red	161CA48/REP
Replacement pump tube pack – 10 tubes	green	161CA32/REP
Replacement pump tube pack – 10 tubes	blue	161CA16/REP
Replacement pump tube pack – 10 tubes	black	161CA08/REP
Delivery tube (low pressure)	30m	155CA48
Inlet tube (3m) plus end weight	unit	152CA05
Quick-fit male/female connector	unit	153CA02
12V DC power supply (UK)	unit	169CA00
12V DC power supply (European)	unit	169CA50