



Contents

Instructions for Use

Ref: 14 IFU Lang Dec 07
G3.1.040

Page	
2	Changing pump tubes
2	Pump tube life
2	Safety
2	Accuracy
2	Electrical supply
2	Water flow sensor
3	G3 programming options
3	Screen control system – G3
6	Water meter total
6	Flow sensor capacities
6	Max. water flows for each dosing ratio
6	Proportional dosing
6	Alarms and warnings
6	Water line pressure
7	Constant pumping
7	Rotor Adjustment
7	Installation
7	Problems / errors
8	Maintenance
9	Max. Min. flow chart
10	Spare parts and accessories
11&12	Schematic layout of the doser

Featuring G3 programming
Litres
Multiple Languages

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Description

The Select dosing system is a proportional additive pump designed to incorporate medications, vaccines, nutritional products acidifiers, and sanitisers into the drinking water of domestic livestock. The components are: the main pump unit, a water flow sensor, a mixing / expansion chamber (if required) and connections to the drinking lines. There are no user serviceable parts inside the Select doser.

Changing Pump Tubes

ENSURE EITHER THE POWER SUPPLY OR FLOW SENSOR LINE 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 air or 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 Cambridge Agricultural are recommended for use in the Select dosing system to ensure accuracy of operation.

Safety

The Select 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 Select doser.

Take precautions to ensure the Select doser can not fall into the stock solution. Consider extra tethering if necessary. Cover stock solution at all times. If immersion does happen accidentally, isolate the Select 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 Select doser is factory set to give accurate dosing. If, during normal operation, the output needs to be increased or decreased slightly, this can be achieved via the screen command "Adjust %".

Electrical Supply

The Select 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 Select doser normally runs below 500mA although starting currents are larger and dependant on the pumping conditions encountered.

The Water Flow Sensor

The standard water flow sensor (VTY10) records water flow from 20 litres/hour to 1500 litres/hour. Over 500 electrical pulses are sent from the sensor to the Select doser per litre of water flow. The standard VTY10 sensor will withstand pressures up to 6 Bar. Ensure that the flow sensor is installed in the water line up-stream of the point at which the Select doser injects the additive into the drinking line. Water flow should be in the direction of the arrow on the sensor.

Several flow sensors can be pre-installed in different drinking lines along with connection points for the additive delivery tube. Lines can then be individually medicated.

The G3 Programme Options

Several options can be pre-allocated in the Select doser when it is supplied new, or can be set by Distributors. The **High Flow Register** can be set to:

- EITHER continue to dose when a larger than expected flow of water is encountered that the doser is unable to keep pace with (possibly on a hot day for example). In this case a warning message will be displayed on-screen to indicate a water flow problem has been encountered.
- OR Stop dosing if a high water flow is encountered and display a warning sign on-screen (for instance if a pig has kicked a water line or some other water pipe fracture has occurred). If this option is chosen the doser will not continue to dose product which would then be wasted. The doser is stopped with a warning message displayed on-screen.

The **Restart Register** can be pre-set to:

EITHER return to the welcome screen in the event of electrical power being lost and then resumed.

This would be a useful option if electrical current disturbance is relatively infrequent and all equipment on a farm would need to be checked and re-set in the event of a power failure.

OR Re-commence doser operation from exactly the point at which the power was lost. This could mean returning to the Meter Only screen (see below for details), or return to the dosing screen and normal dosing operation that was in progress when the power was lost.

Not all options may be available on your doser. For upgrades – please contact your Distributor.

When the electric supply is first connected, the version of the programming will be shown.

<p>This is the Welcome Screen To see the options available press "Set" (Options) To start dosing immediately, press "Adjust (Start)</p>	<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>Select</p> <p>Start Options</p> </div>
<p>If the "Options" button is pressed, the first option is to choose if the doser will continue to dose in a situation when the water flow is out of range (too high). Press Adjust until Y (yes) or N (No) is shown. With Y the doser will run constantly at high water flow. With N the doser will stop dosing and return to the welcome screen at high water flow.</p> <p>Press Set with the correct Y or N shown.</p>	<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>Doser options</p> <p>Cont at Hi Flo Y</p> </div>
<p>Where tube fracture alarm option is fitted, press Adjust to select either Y to enable (activate) the tube burst function, or N to cancel it.</p> <p>Then press Set.</p>	<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>Doser options</p> <p>Tube Burst En. Y</p> </div>
<p>The third option is the selection of operating language. Press Adjust repeatedly until the desired language is shown. Then press Set to return to the Welcome Screen</p> <p>At the Welcome Screen press Start</p>	<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>Doser options</p> <p>Lang. English</p> </div>
<p>IF ONLY WATER METERING (NO DOSING) IS DESIRED</p> <p>Press Adjust (Meter)</p>	<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>Select</p> <p>Meter Dose</p> </div>

<p>Press Adjust repeatedly until the correct flow sensor number (the one to be connected to the doser) is shown.</p> <p>Then press Set.</p>	<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>Sensor Type</p> <p>3</p> </div>
<p>The Select doser is also a water meter. If you wish to reduce the water total to zero, press Set. If you wish to keep the water total already recorded, press Adjust.</p> <p>The water total is updated each 5 minutes. Short recording times may lose a small amount of water data.</p>	<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>Zero water tot?</p> <p>No Yes</p> </div>
<p>This is the metering screen. The flow rate of water is 4,740 litres per hour, Sensor 3 has been selected, and the total on the water meter is 108 litres.</p> <p>Press and hold the Adjust button for a short time to exit this screen.</p>	<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>Meter only 4740H</p> <p>00000108T S3</p> </div>
<p>TO DOSE PRODUCT USING THE SELECT DOSER</p> <p>Press Set (Dose) to start the dosing process.</p>	<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>Select</p> <p>Meter Dose</p> </div>
<p>First choose the flow sensor that is to be connected to the doser (it will be written on a tag attached to the sensor plug).</p> <p>Then press Set</p>	<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>Sensor Type</p> <p>3</p> </div>
<p>By pressing Adjust repeatedly the available ratios are shown. When the desired ratio is shown, press Set</p>	<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>Ratio 1:?</p> <p>50</p> </div>
<p>Ratios of 1:1000 may be shown as on this screen where K is the abbreviation for thousand. 12K5 is 1:12,500, 20K is 1:20,000</p>	<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>Ratio 1:?</p> <p>12K5</p> </div>
<p>Once the desired ratio has been selected, the correct tube to fit is displayed. Fit the correct colour pump tube as described in Changing Pump Tube above.</p>	<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>1:50</p> <p>Use tube: Red</p> </div>
<p>Pump tubes may be slightly too large or too small after manufacture. The correction for this is shown as % Adjust on the packet that the tube was supplied in. Press Adjust to scroll from -20% to +20% until the correct tube adjust is shown. Then press Set.</p>	<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>Adjust %</p> <p>-5%</p> </div>

<p>The Select doser is also a water meter. If you wish to reduce the water total to zero, press Set. If you wish to keep the water total already recorded, press Adjust.</p> <p>The water total is updated each 5 minutes. Short recording times may lose a small amount of water data.</p>	<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>Zero water tot?</p> <p>No Yes</p> </div>
<p>In order to fill up the delivery tube with the product to be dosed, press Set (Yes). The pump will run constantly to fill the delivery tube. Press No if tube filling is not required.</p>	<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>Prime pump?</p> <p>No Yes</p> </div>
<p>This screen will be shown while the pump is running to fill the delivery tube. Press Stop once the tube is full up to the injection assembly.</p>	<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>Priming</p> <p>Stop</p> </div>
<p>For the first few seconds, this screen will be shown. The doser is collecting water flow information before dosing commences.</p>	<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>50 Red -5 0H</p> <p>Dosing... S3</p> </div>
<p>This is the normal dosing screen. A ratio of 1:50 has been selected, the water flow rate is 420 litres per hour, the water meter is showing a total of 106 litres, and Sensor 3 has been chosen.</p>	<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>50 Red-5 420H</p> <p>00000106T S3</p> </div>
<p>If the water flow is too high for the doser to be able to dose correctly, this screen is shown each 5 seconds alternating with the normal dosing screen to show the water total. If "Cont at Hi Flo?" is set at Yes, the doser will run continuously, but will return to normal dosing when the water flow reduces to a manageable level. Press Adjust for a short time to return to the Welcome Screen and clear the "High Flow!" message.</p>	<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>50 Red-5 1420H</p> <p>High Flow! S3</p> </div>
<p>If Tube Fracture detection kit is fitted, and if moisture connects the two gold pins, this message will be shown on-screen and the doser will stop dosing.</p> <p>Press OK to return to the Welcome Screen.</p>	<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>Tube fractured!</p> <p>OK</p> </div>

To make any adjustments to settings, return to the Welcome Screen and progress through the options. To return to the Welcome Screen, press and hold **Adjust** from the Operational Screen.

On the Operational Screen, the following colour abbreviations are used:

Red	Red
Green	Grn
Blue	Blu
Black	Blk

Water Meter Total

Note: the maximum quantity of water that is shown on the water total quantity is 100,000,000 litres. After this the meter will return to zero, and water metering will re-commence as normal.

Flow Sensor Capacities

There is a maximum limit on the flow of water permissible through each flow sensor. The maximum flows are:

TBR 10	400 l/hr
VTY 10	1,500 l/hr
VTH 25	10,000 l/hr
VTH 40	25,000 l/hr

Proportional Dosing

The full range of ratios possible with the Select doser are achieved by using different size pump tubes. The correct pump tube to use for any specific ratio is detailed on the control screen. The tubes are colour coded for ease of recognition.

The dosing ratios in each Select doser are specified by the code number either on the smaller of the two computer chips on the PCB inside the doser, or on the label on the side of the doser. A full list of ratios for each code number is shown under "Dosing Ratio Data" on www.camag.co.uk

During proportional dosing, the Select doser constantly monitors the water flow in the drinking line. Each 5 seconds the doser injects exactly the right amount of additive into the drinking line or tank according to the ratio of administration selected.

Complete mixing of additive into the drinking water is achieved by turbulent flow in pipe-work.

Maximum Water Flows for Each Dosing Ratio

If the Select doser is turning for almost the full 5 seconds of each 5 second dosing period, this is the maximum output of the pump. For each colour pump tube there will be a maximum water flow that can be dosed based on the maximum output of the pump. A table of maximum (approx) water flows for each pump tube colour and each ratio is shown below. If this water flow is exceeded then "High Flow" will be shown on-screen.

Note: The actual maximum water flow allowable will be the lower value from the chart below or the sensor flow capacity shown above (Flow Sensor Capacities).

Alarms and Warnings

If a high water situation is detected where the doser is unable to keep pace, the doser will either continue to dose and display "High Water" on-screen (If the High Flow Register is set to Continue to Dose), or a warning will be shown on-screen and the doser will stop operation (If the High Flow Register is set to Stop Dosing).

If for some reason the rotor becomes jammed or there is a mechanical fault within the pump drive system a warning – "Pump Error" may appear on-screen. If the fault is not immediately apparent and rectifiable, PLEASE CONTACT YOUR DISTRIBUTOR.

Water Line Pressure

The Select doser will operate against a water pressure in the drinking line of up to 2 bar. (2 bar = 28psi = 66ft H₂O = 20.4m H₂O). It may be possible to dose into slightly higher water line pressure of 3 – 4 bar with the blue and black pump tubes. Fit a pressure reduction device if necessary. The flow sensor is rated to 6 bar.

Constant Pumping

If the priming option is selected from the menu on the control screen (see above) the pump rotor will turn continuously regardless of the flow in the drinking line. This can be useful for filling the suction and delivery lines prior to proportional dosing. It can also be used if a particular product needs to be dosed quickly within a given period. The following pumping rates will be achieved when the Select doser is set to "prime":

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

It is not recommended to use the Select doser for more than 2 hours at a time in the priming mode, as tube and motor life will be reduced.

Rotor Adjustment

The rotors in the Select 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 OR THE SIGNAL LINE FROM THE FLOW SENSOR IS DISCONNECTED 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 additive container, or not being able to pump up to 2 bar pressure in the drinking lines, 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 Select doser can be powered from a 12V DC battery or via a transformer from the mains electricity supply. Position the dosing point on the drinking lines so as to be convenient for a power source if power is to be taken via a transformer from the mains. Ensure that the Select doser is properly secured to prevent it becoming immersed in water or stock additive solution.

The flow sensor is fitted with standard fittings which will need to be adapted to fit into existing pipework. Use PTFE tape as necessary to ensure leak-free fitting. Avoid undue strain on the flow sensor during fitting as damage to the sensor may result. The use of a water filter immediately upstream of the flow sensor is recommended. Ensure flow is in the direction as indicated on the flow sensor.

If the quick fit saddle clamp is being used drain the drinking line, drill a 5mm (approx.) hole in the pipe, ensure that the 'O' ring is in position inside the clamp, and tighten clamp over the hole in the pipe. (Alternatively the doser may be supplied with a threaded T piece). The connector is valved. The valve is opened once the male end on the delivery tube is pushed home.

Connect the signal cable from the flow sensor into the Select doser unit. Connect the Select doser to either battery or transformer. Choose program options from the control screen. Ensure pump tube fitted and connected to inlet and outlet delivery tubes. Place inlet tube weight into additive liquid. Connect delivery outlet tube into quick-fit connector clamp. Commence proportional dosing.

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.

Pumping Problems / Errors

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

Problem	Solution
Rotor jamming against the pump tube.	Tighten cross-head adjustment screws on rotor as described in the section "Rotor Adjustment" above.
Error message "High Water" showing on screen.	<ol style="list-style-type: none"> 1. Problem may have passed, check if max. water flow is still being exceeded 2. Consider using more concentrated stock solution at a lower inclusion ratio. 3. Possible pump fault. Contact your Distributor.
Incorrect dosing.	<ol style="list-style-type: none"> 1. Check for low battery power (if external battery is in use) 2. Pump tube should be replaced at least monthly.

	<p>Replace if necessary</p> <ol style="list-style-type: none"> 3. Flow sensor could be entangled with debris. Check and clean if necessary. NOTE: clear carefully – delicate mechanism. Fit filter up-stream of sensor and clean regularly. 4. Is correct dosing ratio selected? 5. Water pressure in the drinking water line should not exceed 2 bar. Fit pressure reduction device if necessary. 6. Incorrect Tube Factor entered on the control screen. Check and re-enter. 7. Incorrect pump tube fitted. Are screen details correct?
Medication not being pumped from stock container.	<ol style="list-style-type: none"> 1. Check all tube connections are firmly in place. 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) 3. Inlet tube could be blocked. Clear as necessary.
Sudden loss of pumping pressure (with possible return of fluid into stock container)	<ol style="list-style-type: none"> 1 Check if there is any lateral movement in the rotor. It is possible the rotor shaft bearings may have worn. Consult Distributor. 2 Check for physical damage to pump head fixing screws. If the pump head is loose, pressure will be lost. DO NOT OVER-TIGHTEN FIXING SCREWS 3 Check that non-return valve is fitted in delivery line
Error message “pump error”	A failure of the motor or data encoder is indicated. Check that connections to circuit board from motor are in place. Consult Distributor.
Proportional dosing does not commence	<ol style="list-style-type: none"> 1. Check flow sensor connected 2. Check there is water flow 3. Is power supply sufficient?

Maintenance

Weekly

Flush out filters protecting the flow sensor.

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 Select doser and inspect interior of pump enclosure. Ensure no ingress of moisture or other contaminant. In case of difficulty, contact your supplier.

Max and Min water flows – all tubes, all ratios
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Ratio 1:		Water		Ratio 1:		Water	
		Min flow	max flow			Min flow	max flow
100,000	White	180	19,200	500	White	0.09	96
100,000	Black	450	48,000	500	Black	2	240
100,000	Blue	1,980	211,200	500	Blue	10	1,056
100,000	Green	7,290	777,600	500	Green	36	3,888
100,000	Red	14,940	1,593,600	500	Red	75	7,968
33,333	White	60	6,400	333	White	0	63
33,333	Black	150	16,000	333	Black	1	159
33,333	Blue	660	70,399	333	Blue	6	703
33,333	Green	2,430	259,197	333	Green	23	2,589
33,333	Red	4,980	531,195	333	Red	50	5,306
20,000	White	36	3,840	200	White	0	38
20,000	Black	90	9,600	200	Black	1	96
20,000	Blue	396	42,240	200	Blue	4	422
20,000	Green	1,458	155,520	200	Green	15	1,555
20,000	Red	2,988	318,720	200	Red	30	3,187
10,000	White	18	1,920	100	White	0	19
10,000	Black	45	4,800	100	Black	0	48
10,000	Blue	198	21,120	100	Blue	2	211
10,000	Green	729	77,760	100	Green	7	778
10,000	Red	1,494	159,360	100	Red	15	1,594
6,000	White	10	1,152	66	White	0	13
6,000	Black	27	2,880	66	Black	0	32
6,000	Blue	119	12,672	66	Blue	1	139
6,000	Green	437	46,656	66	Green	5	513
6,000	Red	896	95,616	66	Red	10	1,052
5,000	White	9	960	50	White	0	9
5,000	Black	23	2,400	50	Black	0	24
5,000	Blue	99	10,560	50	Blue	1	106
5,000	Green	365	38,880	50	Green	4	389
5,000	Red	747	79,680	50	Red	7	797
3,333	White	6	640	33	White	0	6
3,333	Black	15	1,600	33	Black	0	16
3,333	Blue	66	7,039	33	Blue	1	70
3,333	Green	243	25,917	33	Green	2	257
3,333	Red	498	53,115	33	Red	5	526
2,500	White	5	480	20	White	0	4
2,500	Black	11	1,200	20	Black	0	10
2,500	Blue	50	5,280	20	Blue	0	42
2,500	Green	182	19,440	20	Green	1	156
2,500	Red	374	39,840	20	Red	3	319
2,000	White	4	384	14	White		3
2,000	Black	9	960	14	Black		7
2,000	Blue	40	4,224	14	Blue		30
2,000	Green	146	15,552	14	Green		109
2,000	Red	299	31,872	14	Red		223
1,000	White	2	192				
1,000	Black	5	480				
1,000	Blue	20	2,112				
1,000	Green	73	7,776				
1,000	Red	149	15,936				

Spare Parts and Accessories

Item		Code
Select doser unit with VTY10 sensor	Unit	160CA10
Flow sensor (VTY10)	unit	160CA03
Flow sensor (VTH25)	unit	160CA05
Flow sensor (VTH40)	unit	160CA08
Saddle pipe clamp	20mm	105CA20
Saddle pipe clamp	25mm	105CA25
Saddle pipe clamp	32mm	105CA32
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



