SELECT Dosing System

Livestock G5

Instructions for Use

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Contents

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Description

The Select G5 Livestock dosing system combines the Select control computer software with a rugged pump unit to give accurately controlled high pressure dosing.

The Select G5 Livestock doser is designed to allow the dosing of any liquid product into water lines at a wide range of dosing ratios. The components are: the main control unit, a motor with either one or two pump heads attached to it, a water flow sensor, and connections to the drinking lines. There are no user serviceable parts inside the Select control box or the motor unit.

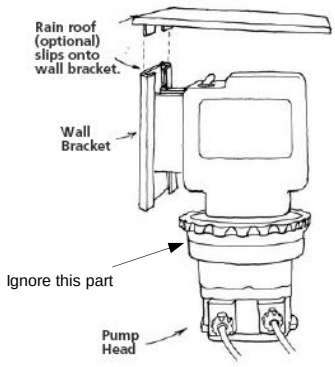
Warning:

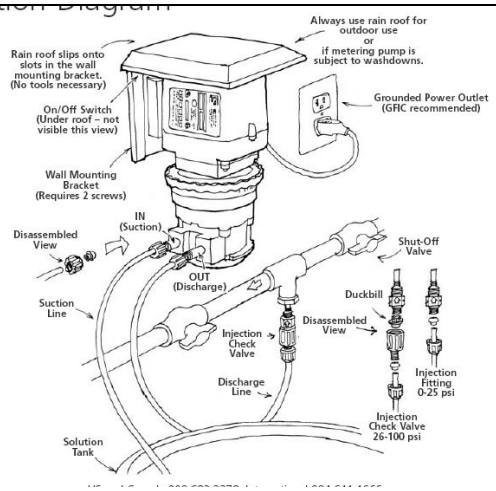
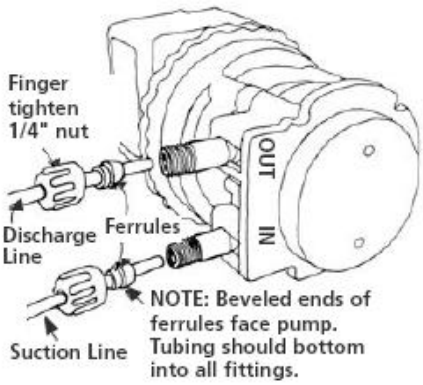
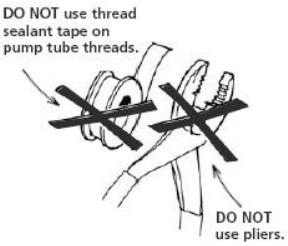
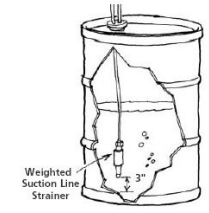
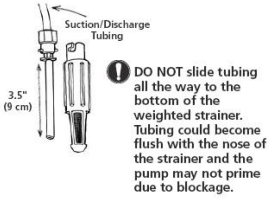
Electrical connections involving 22 – 240V AC should be carried out by competent electricians only

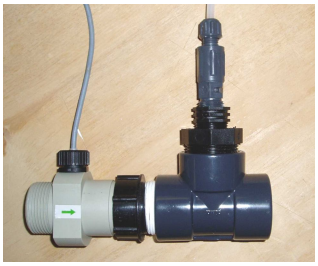
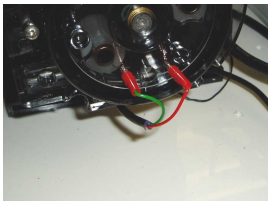
Disconnect from electric supply before opening control box

Beware of pinching fingers in turning rollers when changing tubes

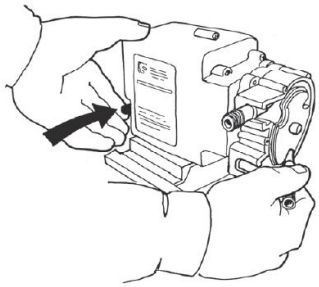
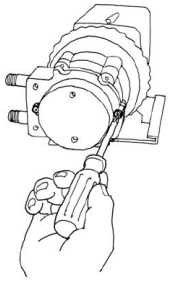
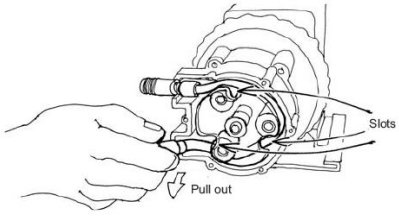
Installation

The Select G5 control box and the motor/pump unit are board mounted and should be positioned within 2 metres of the stock solution container. Two separate electrical connections need to be allowed for; 12V DC 300mA from a transformer (supplied) to power the doser control box, and mains electrical power for the motor/pump unit (220 - 240V AC or 110V AC depending on local conditions and the voltage specified on the motor). Ensure that the motor supplied is correctly specified for your area. The complete G5 system is supplied as shown with either a single or double (illustrated) pump-head with one tube size fitted. See below for tube size options.	
The motor/pump unit should be mounted vertically with the pump head lowest. This is one mounting possibility. The rain roof can be used to protect the motor from dirt and moisture. Note: the motor/pump unit is rated for outside use, but the control box is rated for indoor use only. Do not mount the Select G5 system over an open topped stock container as fumes can affect the component parts. Protect the motor unit from ingress of liquids.	

This is a generalised layout diagram. Not shown are the Select G5 control box and the flow sensor installation. With this pump system a non-return valve is fitted regardless of pumping pressure An RCD device is recommended to be used on the mains electric supply point.	
Flow sensor installation. The sensor should be fitted upstream of the injection assembly T piece with water flow in the direction of the arrow on the sensor.	
The delivery tube should be cut cleanly to the desired lengths to suit the suction part from the bottom of the stock container to the pump, and from the pump to the injection point. The ferrules are coloured (blue in most countries but clear or white in USA/Canada and Mexico) shaped washers that ensure the seal between the delivery tube and the pump tube end fitting.	
It is important that the plastic nuts are only tightened by hand otherwise the ferrules will be damaged. Hold the pump tube end fitting with one hand while tightening the nut with the other. Use no PTFE or other sealing tape.	
The Select G5 Livestock doser is supplied with en end weight with strainer to fit to the suction tube. If no strainer is required use an alternative end weight (stainless steel nut or similar). Remove the collet from the end weight, push the suction tube 9omm or so through the collet, then re-fix the collet to the weight.	 

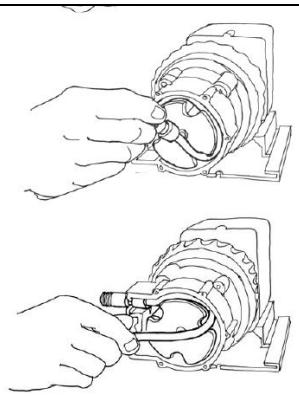
The discharge delivery tube is fitted to the injection assembly in the same way is the delivery tube is fitted to the pump tube ends. Use the plastic nut and ferrule. Tighten by HAND only.	
To ensure that pump head damage is kept to a minimum in the event of a fractured tube, fit the tube-burst pins into the two small holes in the pump head cover plate as shown. If a tube should fracture, the dosing operation will be stopped and a warning "Tube Fractured!" will appear on the screen.	
Check all connections by re-pressurising the water system and running the motor/pump unit as described below. Tighten / re-fit any connections that show leakage.	

Changing Pump Tubes

Ensure the pump is turned on by using the on/off switch on the rear of the motor. The motor is turned during tube fitting using the "Load Tube" function on the control system.	
Remove the two screws as shown and then remove the pump head cover by lifting the side opposite the tube fittings. Set the doser control screen to Load Tube At this point the pump rotor will turn 0.3 seconds on, and 1.0 seconds off. Lift out the suction end of the pump tube and guide the tube out of one of the three slots in the roller assembly when convenient.	
Guide the tube completely out of the roller assembly.	

When the tube is away from the roller assembly, either turn off the motor on the switch at the back of the , or press “Stop” on-screen.

Completely remove the tube assembly.

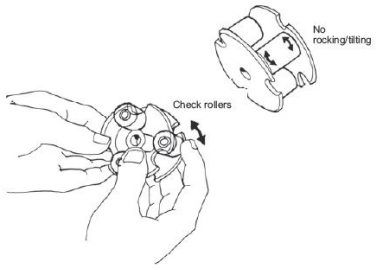


Remove the roller assembly and housing from the motor shaft. The housing is removed by turning it by 1/8th turn in a clockwise direction and pulling clear. If there is chemical or dirt build-up preventing the housing from being pulled clear, use a flat head screw driver to lever the housing away from the motor AFTER turning by 1/8th turn.

Clean all parts (pump head housing, roller assembly and cover) as necessary.

Check housing for cracks and replace if cracked.

Ensure rollers turn freely. Check rollers for excessive side play from bore wear. Replace roller assembly if worn.



Inspect the suction and discharge tubing, point of injection and non-return valve for blockages. Clean and/or replace as required.

Re-install the clean housing and roller assembly.

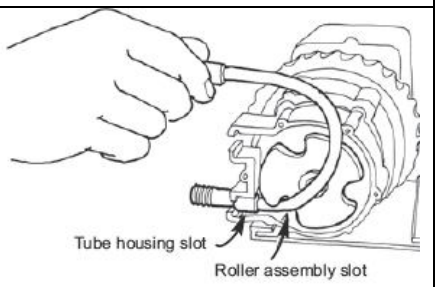
You will find it easier to fit a new tube if the motor unit is securely fixed to a horizontal surface.

Manually turn roller assembly anti-clockwise to line up a slot with the tube housing slot.

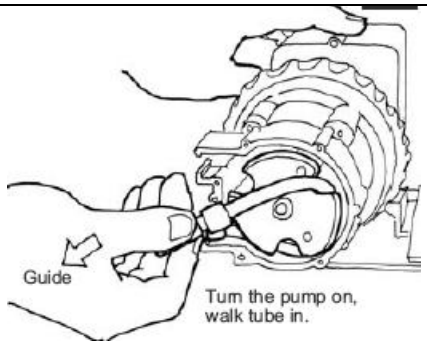
Place the tube fitting into the housing and roller assembly slot.

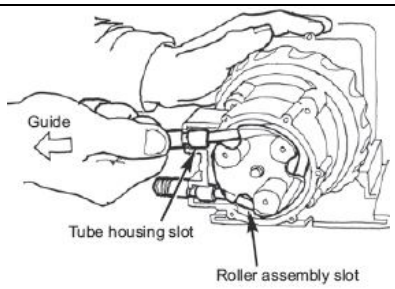
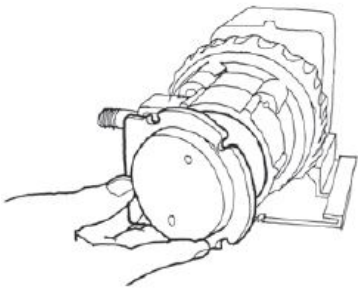
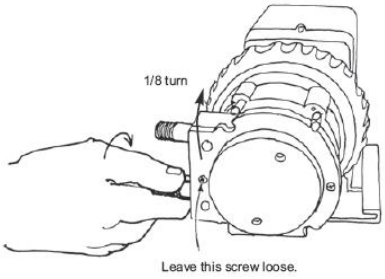
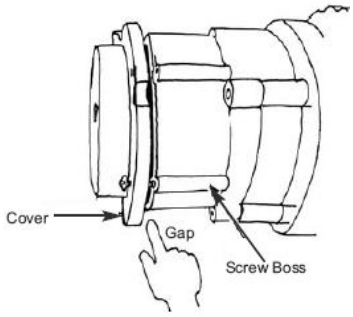
Use the “Load Tube” function, hold the threaded tube fitting and guide the tube with slight tension towards the centre to prevent pinching between the housing and roller assembly.

TAKE CARE NOT TO PINCH YOUR FINGERS OR THE TUBE.



When the tube reaches the top housing slot, press Stop.



With the tube end assembly held in the slot, Use the Prime function and allow the rollers to turn and stretch the tube into place. NOTE: Take extra care when fitting Tube #7, as this is the largest high pressure tube and requires some effort to ensure stretching to the correct length. You may find it easier to fit one of the plastic end nuts (supplied) on to the end of the tube assembly to enable greater purchase when guiding the tube end. A used tube will stretch approximately 18mm over its life. The new tube will appear stiff and short, hence the need to allow the rollers to stretch the tube into place. Fit tube end assembly into the slot when able to do so. Turn the motor off.	
A small amount of grease (AquaShield®) recommended can be applied to the bush in the pump cover. Replace the cover and screws leaving the screw between the tube fittings loose so that the tube fitting can be rotated to centre the tube on the rollers.	
To centre the pump tube on the rollers, ensure that the Select control screen is still showing Priming… Turn the motor on. Turn the IN (suction) tube fitting located on the bottom of the pump head not more than 1/8th of a turn in the direction that the tube must move. Do not let go of the fitting until the tube rides approximately in the centre of the rollers. Turn the motor off. Let go of the fitting and tighten the cover screws.	
The cover is not on securely if there is a gap between the screw head and the pump cover. If a clicking noise is heard when the rollers are turning, the cover is not fully in place. Check and re-tighten the screws as necessary NOTE: If the screw holes become damaged, it is possible to use 2 other diagonally opposite holes in the pump cover and housing. The screws are self-tapping.	

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. The life of the pump tubes is estimated to be up to 1 year in optimum conditions, but the tube life could be considerably less depending on local conditions. Ensure that the tube-burst function is correctly fitted and activated to ensure that the Select G5 Livestock doser stops immediately that a tube

fracture is detected. Periodic inspection and replacement of the pump tube will ensure that tube fractures are avoided.

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 G5 Livestock doser.

Take precautions to ensure the Select G5 Livestock 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 G5 Livestock doser from the electrical supply immediately.

The use of safety circuit breakers is recommended. If in doubt seek advice from a qualified competent 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 G5 doser uses a 12V DC power supply for the control box. This can either be supplied from a 12V battery or via a transformer power supply from the mains electricity supply. A 300mA maximum current power supply is recommended.

The pump motor requires a mains electrical connection of 220-240V AC 50Hz single phase (110V AC 60Hz in USA, Canada and Mexico).

Operation

1	This is the **Welcome Screen** To see the options available press “Set” (Options) To start dosing immediately if no changes are required, press “Adjust” (Start). See Screen 18 below for further instructions.	Select Livestock Start Options
2	If the “Options” button is pressed, the first option is to enter the number of livestock units to be dosed (see below for definitions) Press Adjust to enter the Livestock units	Doser options Stock units
3	The change each digit in turn, with the cursor under the first digit press Adjust repeatedly until the correct digit is shown, then press Set to move to the next digit. For less than 1000 Livestock Units, ensure the first digits are zeros e.g. 0576 for 576 Livestock Units. Press Set after the final digit is chosen. The following screen will be shown:	Stock Units? 1100
4	Press Adjust to re-enter Livestock Units, or Set to move to the next Option. Pressing Set will show:	Doser options Stock units
5	The dose per head is the amount to be dosed per Livestock Unit. Pressing Set will move to the next option. Press Adjust to enter the dose per head. The following screen will be shown:	Doser options Dose per head

6	There are 15 choices of dose per head (normally ml per head) programmed into the doser. Press Adjust repeatedly until the correct dose per head is shown, then press Set to accept this choice. If the required dose per head is not listed, please contact your Distributor. The following screen is shown after pressing Set:	Dose per head? 3.00
7	In normal working the Livestock doser will record yesterday's water total and use that figure to accurately dose the required amount of product over the full 24 hours today. On initial set-up, there will not be an accurate value stored for yesterday's water total, so an estimate can be entered. Press Adjust to enter a value for yesterday's water total. The following screen is shown:	Doser Options Total Yesterday
8	If the total is left as 0000, the Livestock doser will not dose during the first 24 hours, but the water flow will be recorded and the doser will commence dosing at the end of the first 24 hours using the correct value of water total (see Screen 21) If it is possible to enter an estimation of yesterdays water total (e.g. 10% of the bodyweight of the stock being dosed), adjust each digit when it has the cursor under it by pressing the Adjust button repeatedly. Press set when each digit is correct. **NOTE**: The units are in 100 litres. So a water total of 50,000 litres is shown as 0500 (ensure the initial digit is a zero) When Set is pressed after the final digit is selected the following screen is shown:	Total Yesterday? 0000
9	To re-enter yesterday's water total press Adjust. Otherwise press Set to show the following screen:	Doser Options Total Yesterday
10	If no changes are required to be made to the sensor number press Set. To enter or change the sensor number press Adjust to show the following screen:	Doser Options Select Sensor
11	The flow sensors supplied with the Livestock doser have a tag on the connection plug showing the number of the sensor. To change the sensor number, press Adjust repeatedly to show the correct number. Sensor 3.1 is Sensor 3 with one pump-head, Sensor 5.2 is Sensor 5 with 2 pump-heads etc. Then press Set to show the following screen:	Sensor Type? S3.1
12	If the Livestock doser is fitted with an alarm system to indicate that a pump tube has burst, the alarm system can be enabled by pressing Adjust to change the N (no) to Y (yes). If this alarm system is not required or not fitted, N has to be shown. Then press Set to show the following screen:	Doser Options Tube Burst En. Y

13	Options are now complete. This is the Welcome Screen. To make further changes to the Options, press Set. To start dosing press Adjust and the following screen will be shown:	Select Livestock Start Options
14	The pump tube #2 needs to be fitted. See the section above – Changing Pump Tubes. Press Set to see the following screen:	Use tube #2
15	To take account of inaccuracies in the extrusion of the pump tube, we recommend that a digital adjustment is made to correct the accuracy of the Livestock doser. The Adjust % is shown on the packet containing the pump tube as supplied with the doser. Press Adjust repeatedly to show the correct Adjust %. (Note – The digits will scroll 0 to +20 to -20 to 0 again. When the correct Adjust % is shown press Set to show the following screen:	Adjust % +0
16	This is the tube loading facility. In order to have the rotor turning slowly to either load a new tube (or remove an old tube), press Set. The rotor will be turning for 0.3 secs and stationary for 1.0 sec. Press Stop when required.	Load tube? No Yes
17	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.	Prime pump? No Yes
18	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.	Priming Stop
	For the first 20 seconds, the doser will collect information on the flow of water. The rotor will not turn in this period. After 20 seconds, the following screen will be shown:	R15151 #2 +0% Dosing… 0H
19	This is the dosing screen shown during the normal operation of the G5 Livestock doser. The screen will change every 20 seconds to reveal more information. This is the screen shown during the first 5 seconds. The doser is dosing at a ratio of 1:15151 The tube #2 is fitted with an Adjust % of +0% The total water used in the present 24 hour period is 6700 litres - (0067T) The water flow at the present time is 8,900 litres per hour (89H) -(changes each 20 seconds) At the start of the next 24 hour period (when 23.59/24 on the timer changes to 0.00/24) a new dosing ratio will automatically be adopted to reflect a new 24 hour water record.	R15151 #2 +0% 0067T 89H

	This is the screen shown during the following 20 second period. The total water used yesterday was 50,000 litres (0500Y) 1100 Livestock Units are being dosed (C is the number of stock) The dose per Livestock Unit is 3.00ml We are 1 hour and 29 minutes into the present 24 hour period At the start of the next 24 hour period (when 23.59/24 changes to 0.00/24) a new dosing ratio will automatically be adopted to reflect a new 24 hour water record.	0500Y 1100(C) 3.00ml 1.29/24
20	If yesterday's water total was zero, the dosing screen will show these details. This is the first screen showing 0000Y as yesterday had a zero total. The doser will not be dosing, but water data is being collected.	0000Y 1100(C) 3.00ml 3.24/24
21	The following 20 seconds this screen will be shown. R0 is shown as no dosing ratio is available until 24 hours of water data has been collected. Data is shown as data is being collected on water consumption during the present 24 hour period (we are only 3 hours and 24 minutes through the present 24 hour period).	R0 #2 +0% 0059T Data 21H
22	If, during normal dosing, the Livestock Doser recognises that dosing has been completed before the end of a 24 hour period due to water consumption being higher than yesterday, the doser will stop operating to avoid over-dosing. For the remainder of the 24 hour period this screen will be shown (dosing is Done), water data will continue to be collected until the end of the 24 hour period.	R15115 #2 +0% 0128T Done 32H
23	If stock numbers or product per head rate have been entered incorrectly, or unexpected very high water flow rates have been encountered, the pump will still be turning at the end of the 20 second dose period. The software will recognise this as an error situation and will display the "Underdose!" message on the screen.	R2 #2 +0% Underdose! 951H
	Pressing and holding the Adjust button for 0.5 secs will return to the Welcome Screen.	Select Livestock Start Options

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.

Sensor Numbers

Because the pump can be fitted with either one or two pump-heads, the sensor numbers are shown as follows to take account of the different output performance:

Sensor Number	Sensor	Pump-heads	On-Screen definition
2	VTY10	Single	2.1
2	VTY10	Double	2.2
3	VTH25	Single	3.1
3	VTH25	Double	3.2
5	VTH40	Single	5.1
5	VTH40	Double	5.2

For the G5 Livestock doser, the normal tube fitting is 1 x #2.

Pump Tubes, Water-Line Pressures and Outputs
The pump tubes available for use with the Select G5 Livestock doser are available in six sizes (different internal diameters). And in a harder and softer style. The harder tubes are smaller in size and can be used with higher water line pressures. The softer tubes are available in both small and large size but can only be used for pressures up to 2 bar. The following chart shows the tubes available:

Smaller ↓ Larger	**Tube Number #**	**Hard or Soft**	**Pressure Ability (bar)**	**Maximum Output at Constant Running**
	1	Hard	0 – 6.9	0.78
	2	Hard	0 – 6.9	2.46
	7	Hard	0 – 6.9	5.05
	3 (rarely used)	Soft	0 – 2.0	5.05
	4 (rarely used)	Soft	0 – 2.0	7.57
	5	Soft	0 – 2.0	12.90

For the Select G5 Livestock Doser, the normal tube fitting is 1 x #2

Calculation of Maximum Water Flow for Different Ratios
The maximum water flow that can be dosed is:

Max. pump output x ratio = Max water flow

So, if Tube #2 is fitted and the Select G5 Livestock system is dosing at a ratio of 1:20,000, then the maximum water flow that can be dosed before the doser displays “High Flow” is 2.46 x 20,000 = 49,200 litres per hour.

If the Select G5 Livestock doser is turning for almost the full 20 seconds of each 20 second dosing period, this is the maximum output of the pump. For each pump tube size there will be a maximum water flow that can be dosed based on the maximum output of the pump.

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).

Dosing with a Double Pump-Head
This will not normally be necessary with the Livestock program.

An extension drive shaft needs to be fitted to the pump before two pump-heads can be used. See separate instructions accompanying the shaft for fitting guidance.

When two pump heads are fitted, the low pressure tubes (#3, #4 and #5) can be fitted to both pump heads.

If the water line pressure is above 2 bar and two pump heads are fitted, only tubes #1 and #2 can be fitted to each pump head. It is not possible to fit two tube #7 to the two pump heads as there is not sufficient motor power. In fact a single pump head fitted with tube #7 gives a greater output than two tube #2.

Note: The rotor assembly is marked with Side A and Side B. Side B will normally have three small silver magnets fitted – these should always be closest to the motor face for the **inner** pump-head. The outer pump-head should ideally have the opposite face (normally A) facing the motor. This helps to lessen strain on the motor, as the rollers will be offset.

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:

VTY 10 (Sensor 2)	1,500 l/hr
VTH 25 (Sensor 3)	10,000 l/hr
VTH 40 (Sensor 5)	25,000 l/hr

Dosing
During dosing, the Select G5 Livestock doser constantly monitors the water flow in the drinking line. Each 20 seconds the doser injects exactly the right amount of additive into the drinking line according to the ratio of administration calculated for the day. At low water flows it is possible that the doser will not pump in every 20 second period. In this case water flow information is stored inside the doser and the pump rotor operated when a minimum dose can be applied.

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

Alarms and Warnings
See above for Underdose!, Done and Data messages.

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 reason for this is not immediately apparent and rectifiable, PLEASE CONTACT YOUR DISTRIBUTOR.

Water Line Pressure
The doser will operate against a water pressure in the drinking line of up to 2 bar for tube numbers 3, 4 and 5. (2 bar = 28psi = 66ft H_2O = 20.4m H_2O). Pressures up to 6.9 bar can be dosed with pump tubes 1, 2 and 7. Fit a pressure reduction device if necessary.

Constant Pumping (Priming)
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 Number #	Priming pump rate l/hr One pump head	Priming pump rate l/hr Two pump heads
1	0.78	1.56
2	2.46	4.92
7	5.05	Not possible
3	5.05	10.10
4	7.57	15.14
5	12.90	25.80

It is not recommended to use the Select G5 Livestock doser for more than 2 hours at a time in the priming mode, as tube and motor life will be reduced.

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.	This is most likely to happen with Tube #7. Run the pump on Prime for 30 mins. to bed the tube in before dosing.
Error message "High Water" showing on screen.	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.
Unexpected "Tube Fractured" message	Check if the pump tube is fractured or if there is liquid in the pump head connecting the two gold pins. If the tube fractured system is <u>not</u> in use, the tube fracture en. Option should be N.
Incorrect dosing – dose too low	1. Is the correct tube fitted as shown on-screen? 2. Is water line pressure too high? 3. Is non-return valve blocked? 4. Is injection point blocked? 5. Is inlet filter blocked? 6. Has the doser been running on High Flow and

	unable to keep up with the water flow? 7. Has water flow periodically been lower than the rating of the sensor (see Flow Sensor Capacities above)? 8. Check inlet tube joints for leaks as air may get sucked in
Incorrect dosing – dose too high	1. Is the doser in the vicinity of High Tension Power cables? If so move the doser as there may be interference. 2. Is the correct tube fitted as shown on-screen?
Medication not being pumped from stock container.	1. Check all tube connections are firmly in place. 2. Check there are no blockages anywhere in the delivery line up to the injection point.
Sudden loss of pumping pressure (with possible return of fluid into stock container)	1 Check if there is any lateral movement in the rotor. See Changing Pump Tube above 2 Check for physical damage to pump head fixing screws. If the pump head is loose, pressure will be lost. 3 Check that non-return valve is fitted in delivery line 4 Check that pump tube is not fractured.
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	1. Check flow sensor connected 2. Check there is water flow 3. Check the turbine in the flow sensor is free to turn and not snagged. 4. Is mains electric power supply connected to the pump? Is the on/off switch on the rear of the motor in the "up" (on) position?

Maintenance

Weekly

Flush out filters protecting the flow sensor.
Flush inlet filter on the suction tube end weight
Inspect the pump tube for signs of wear.
Check doser output. Adjust as necessary via the control screen.

Monthly

Replace pump tube 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 control box. Ensure no ingress of moisture or other contaminant. In case of difficulty, contact your supplier.

Spare Parts and Accessories

Item		**Code**
Select G5 Livestock doser with UK plug and 1 x #2 pump-head	Unit	365CA1#2-UK
Select G5 Livestock doser with European plug 1 x #2 pump-head	Unit	365CA1#2-EU
Select G5 Livestock doser with Australian plug 1 x #2 pump-head	Unit	365CA1#2-AUS
Select G5 Livestock doser with USA plug 1 x #2 pump-head	Unit	365CA1#2-US
Flow sensor (VTY10)	Unit	160CA03
Flow sensor (VTH25)	Unit	160CA05
Flow sensor (VTH40)	Unit	160CA08
Replacement pump tube (for #2 tube)	Unit	380CA#2
Additional standard pump head complete with tube #2	Unit	369CA#2
Ferrules (blue 6mm)	Unit	385CA21
Delivery tube, LDPE	6m	385CA27
Locking nut - replacement	Unit	385CA22
End weight assembly - replacement	Unit	385CA23
Injection assembly (including duckbill NRV)	Unit	385CA24
Duckbill NRV insert	Unit	385CA25
Roller assembly only	Unit	385CA28