



SELMECH SUPPLIES OSD DIGITAL CONTROL BOX USER MANUAL

Selmech Supplies Ltd
19/20 Whittle Road
Norton Enterprise Park
Churchfields Ind Est
Salisbury
Wiltshire
SP2 7YS
+44 (0) 1722 413440
admin@selmechsupplies.co.uk
www.selmechsupplies.co.uk

The control box monitors and adjusts the pump to maintain a precise delivery of the preservative being applied depending on the settings entered by the user.

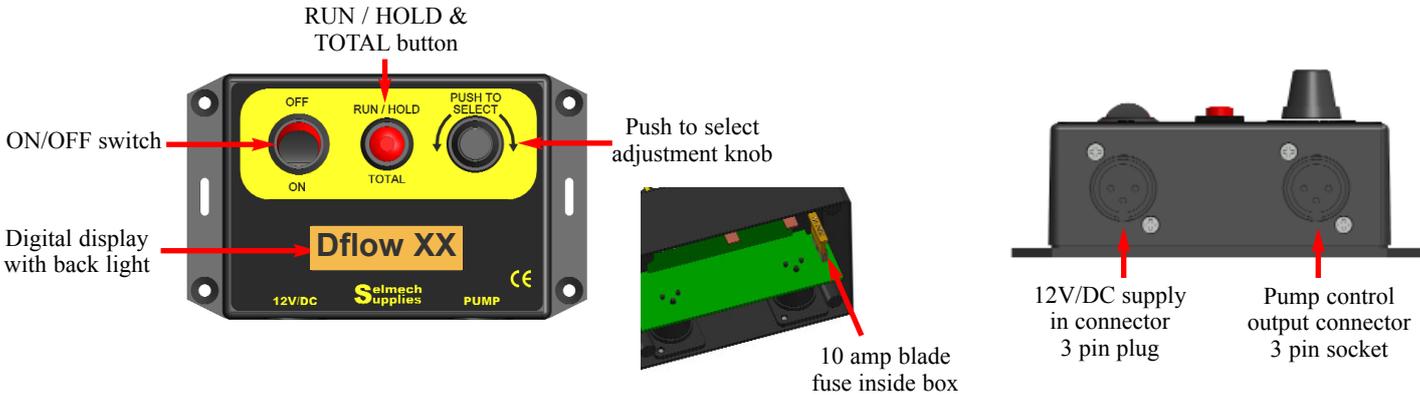
The control box has: -

A digital display with back light, ON/OFF switch. A run / hold, total button to stop and start the pump manually and display and zero total counts, A control knob that has a push function to display and enable adjustments.

3 way male connector for the 12 volt DC supply labelled 12V/DC

3 way female connector for the control output to the applicator labelled "PUMP".

The control box is fitted with an internal 10 amp fuse.



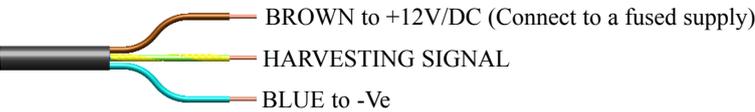
Connecting to the supply

The 12-volt input connector (3 pin socket) has a 3-core cable.

If your machine has a harvesting signal available this can be connected to the Green/Yellow wire to stop and start the applicator automatically. Some machines provide a +12v signal when harvesting and some provide a +12v when not harvesting. Either can be accommodated *Refer to Setting the control box operating mode section "PAUSE MODE"*

The connection are: -

For a harvester with a harvesting signal available connect: -



For a harvester without a harvesting signal available ignore the green yellow and set the PAUSE MODE to N in the set up routine.

Refer to the "Setting the control box operating mode" section in this manual

RUN / HOLD and TOTAL button

If there is no harvesting signal available like a table/header switch the HOLD / RUN button can be pressed and released to stop and start the pump manually.

NOTE:
DO NOT use the "ON OFF" switch to stop and start the applicator as there will be a delay in the pump starting.
 The total additive applied can be viewed by holding in this button until "Total" is displayed and then releasing.

Operation

Get to know the operation of the applicator before using additive. These instructions assume that a table/header sensor is not connected or has been disabled. The control box is supplied with the correct "calibration factor" Refer to the "Setting the control box operating mode" sections in this manual to set it up to suit your requirements.

Turn on the control box. it will display the following in succession: -

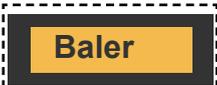
Model type

The control box will be delivered set to the correct model for your applicator. **This should not be changed!**



Currently selected operation Mode

There are 3 operating modes that the control box can set to run in. Refer to - **Setting the control box operation mode**



Harvesting rate

This will depend on the applicator supplied and operating mode that has been selected.



NOTE (In normal operation if wired to use the harvesters table sensor Pause will now be displayed. In this situation the motor will not run but the harvesting rate can be set by turning the adjustment knob.)



Setting the control box operating mode



Entering the set-up routine

To enter the set-up routine press and hold the “PRESS TO SELECT” knob when at the same time switching the control box on.

The control box will display a set of dashes (-----) for a short period before displaying “Set-up” now release the “PRESS TO SELECT” Knob and the current operating mode will be displayed.

Changing the operating mode

Turn the “PRESS TO SELECT” knob to scroll through the available mode options shown below.



Application rate is set and Tonnes Per Hour harvested



Application Rate is set Per Minute



Application Rate is set, the Bale weight and Bales made per hour.

! Bales made per hour should not include the time taken to wrap or eject the bale.

We do not recommend using ULV applicators with balers.

When the preferred option is displayed press the “PRESS TO SELECT” knob and -Set- will be displayed.



Applying a calibration factor

The display will now show “Def-Cal”. This applies the default calibration value for the current model. Turning the “PRESS TO SELECT” knob displays “Man-Cal” to manually enter a calibration factor *(This is for special applications and should not be done unless specifically instructed.)*

Press the “PRESS TO SELECT” knob and -Set- will be displayed.

The following “PAUSE”, “HOLD” and “TOTAL” can all be set to suit your preferences. If “PAUSE” is enabled, for example when using a table/header sensor, pause will have priority over “HOLD”.

If the pause function is enabled and “PAUSE” is displayed on the control box the RUN / HOLD hold button will not restart the applicator and will **NOT** change state if pressed.

PAUSE MODE



Enable normal switching (Y) Inverted switching (I) or Disable the function (N)

Turn the “PRESS TO SELECT” knob to scroll through the options.

If your machine has a harvesting signal available this can be connected to the Green/Yellow wire to stop and start the applicator automatically. Some machines provide a +12v signal when harvesting and some provide a +12v when not harvesting. Either can be accommodated by choosing Pause Y (+12 for harvesting) Pause I (+12v for not harvesting) or if the function is not required select Pause N to disable it.

Press the “PRESS TO SELECT” knob and -Set- will be displayed.

Setting the control box operating mode *continued*



Enable (Y) Disable (N) HOLD MODE

If there is no table/header switch connection available the HOLD / RUN button can be pressed and released to stop and start the applicator manually. If you do not want to use this function turn the “PRESS TO SELECT” knob and select HOLD N.

Press the “PRESS TO SELECT” knob and -Set- will be displayed.



Enable (Y) Disable (N) TOTAL COUNTS

If you do not want to view the total of additive applied then turn the “PRESS TO SELECT” knob and select TOTAL N.

Press the “PRESS TO SELECT” knob and -Set- will be displayed.



Trim

Trim allows you to adjust the preset calibration by +/- 9%

If it is considered that the output is slightly inaccurate this function allows you, by turning the “PRESS TO SELECT” knob left or right, to increase or decrease the output approximately from 0 to 9%.

Press the “PRESS TO SELECT” knob and -Set- will be displayed.



Exit the set-up routine

The display will now show “Exit Yes”. Turning the “PRESS TO SELECT” knob will allow you to chose No. Pressing the “PRESS TO SELECT” knob with No displayed will take you back through the set-up routine again.

Pressing the “PRESS TO SELECT” knob with Yes displayed will exit the set-up routine.



Run mode

The display will now show “-SAVE-”. and the control box will beep twice before displaying the current model it is set for and then going into the run mode display.

Refer to the “set control box for harvesting” section for instructions on operating the control box in run mode.

Setting and using the control box

Auto mode

Enter the application rate



Press the “PUSH TO SELECT” knob to display the application rate in either millilitres (ml/t) or litres per tonne (l/t) depending on model. Rotate the knob to set your application rate.

Always consult your additive supplier for the application rate that best suits your foraging conditions.

Set your harvesting pick-up rate in tonnes per hour



Press the “PUSH TO SELECT” knob again to display t/hr. Rotate the knob to select the rate your forage will be picked up. This can be adjusted at any time to suit changes in crop density.

Manual mode

Set the output rate



In Manual Mode the output is set in either millilitres (ml) or litres per minute (l) depending on model.

Baler mode (We do not recommend using ULV applicators with balers.)

Set your bale weight



Press the “PUSH TO SELECT” knob to display the bale weight in Kg. Rotating the knob allows to enter your bale weight between 0020 Kg and 2000 Kg.

Enter the application rate



Press the “PUSH TO SELECT” knob again to display the application rate in either millilitres (ml/t) or litres per tonne (l/t) depending on model. Rotate the knob to set your application rate.

You should always consult your additive supplier for the application rate that best suits your bales.

Set how many bales made in bale an hour



Press the “PUSH TO SELECT” knob again to display b/hr. Rotate the knob and enter the number of bales per hour you will be making, between 020 and 200 b/hr. **!** This should not include time taken to wrap or eject the bale.

Other features

In Auto, Manual and Baler Mode pressing and holding down the “PUSH TO SELECT” knob will display the calculated amount being dispensed in millilitres per minute (ml)



In all Modes the scrolling bars at the end of the display should be going from top to bottom showing that the applicator is achieving its target rate.



Displaying and clearing total counts

Press and hold the RUN/HOLD - TOTAL button until Total is displayed and release to view the total dispensed counter. *After a few seconds the display will always revert to showing t/h or l* You can enable (Y) or disable (N) the “Total” button function in the set-up menu.



To clear the counter to zero, with the total counter displayed, press and hold the RUN/HOLD - TOTAL button until “Reset” is displayed and release.



Warning messages

Warning message - LIMIT

The application rate combined with the forage pick-up rate entered sets the applicator to dispense the correct amount of additive

The combination of values entered by the user must fall within the parameters of the applicator. A warning message "Limit" will be displayed if they are outside of these parameters.



If the calculated target flow rate exceeds the specified maximum flow for the selected model the display shows "> Limit"



If the target flow is less than the specified minimum flow for the selected model the display shows "Limit <"

Warning message - Fluid Low (only on selected models)

If you have a low level switch fitted when the level of the fluid falls below the switch a warning message is displayed saying FLUID LOW. An audible alarm will also sound.

Unplugging the low level switch will disable this function and the control box will work normally.



Warning message - PAUSE

If using your harvester table/header sensor to turn the applicator on and off a "PAUSE" message is shown on the display when the header is up. An audible alarm will also sound. When lowered, operation will resume at the same setting as before and your selected harvesting rate will be displayed.

You can enable (Y) or disable (N) the "PAUSE" button function in the set-up menu.



Warning message - HOLD

If using, pressing and releasing the RUN / HOLD button to turn the applicator on and off a "HOLD" message is shown on the display when the the applicator is stopped. An audible alarm will also sound. Pressing and releasing the "RUN / HOLD" button again the applicator will resume at the same setting as before and your selected harvesting rate will be displayed.

You can enable (Y) or disable (N) the HOLD button function in the set-up menu.



Warning message - CHECK FLOW

A warning message "CHECK FLOW" can be displayed until the set flow rate is achieved. An audible alarm will also sound.

If "CHECK FLOW" is displayed frequently it could mean there is a fault in the system.



Warning message - LOW VOLTS

If the voltage to the control box drops below 10 volts data will be saved, the back light on the display will go out and the display will show "LOW VOLTS". If this happens check your supply to the controller.



Warning message - No Crop

If using the Crop detection System when there is no crop being detected the control box display will say "NO CROP". An audible alarm will also sound.

Unplugging the crop detector will disable this function and the control box will work normally.



NFS mode

If there is a problem with the flow sensor the applicator can be run in NFS mode. In this mode the control box ignores the sensor and just operates the motor directly. The output to the motor is displayed in % drive to the motor, 000 to 100. In this mode it will be up to the operator to carry out their own calibration check.

How to select NFS Mode

To enter the set-up routine press and hold down the "PUSH TO SELECT" Knob when at the same time turning the control box on.



Keep holding down the "PUSH TO SELECT" Knob. The display will first show "-----" then after about 5 seconds it will display "Set-up". Continue to hold in the "PUSH TO SELECT" Knob.

Continue to hold in the "PUSH TO SELECT" knob.



Keep holding down the "PUSH TO SELECT" Knob. until the display shows "SetModel". then release the "PUSH TO SELECT" Knob.



Selecting NFS mode

The control box will now display the current model . At this point by turning the PRESS TO SELECT knob, clockwise or anti clockwise, you can change model. Turn the knob until "NFS" (NO FLOW SENSOR) is displayed.

NO OTHER MODEL SHOULD BE SELECTED !

With "NFS" displayed on the display press the "PUSH TO SELECT" knob once.



The display will now show "-SAVE-". before going into the run mode display.

Operating the control box in NFS mode

Set output rate of the applicator in % drive to motor



Rotating the "PUSH TO SELECT" knob will increase and decrease the percentage drive to the motor (000 to 100) this in turn increases and decreases the output of the applicator.

Total counts and calculated flow rate are not available in NFS mode

The thru beam crop detector

Overview

The thru beam detector kit is designed to be used in conjunction with a Selmech Supplies in cab digital controller that is fitted with a 4 pin connector between the supply and applicator connector.

When connected it will automatically, when the beam is broken, turn the applicator on when crop is detected at the point of pick-up. When there is no crop the applicator will be turned off.

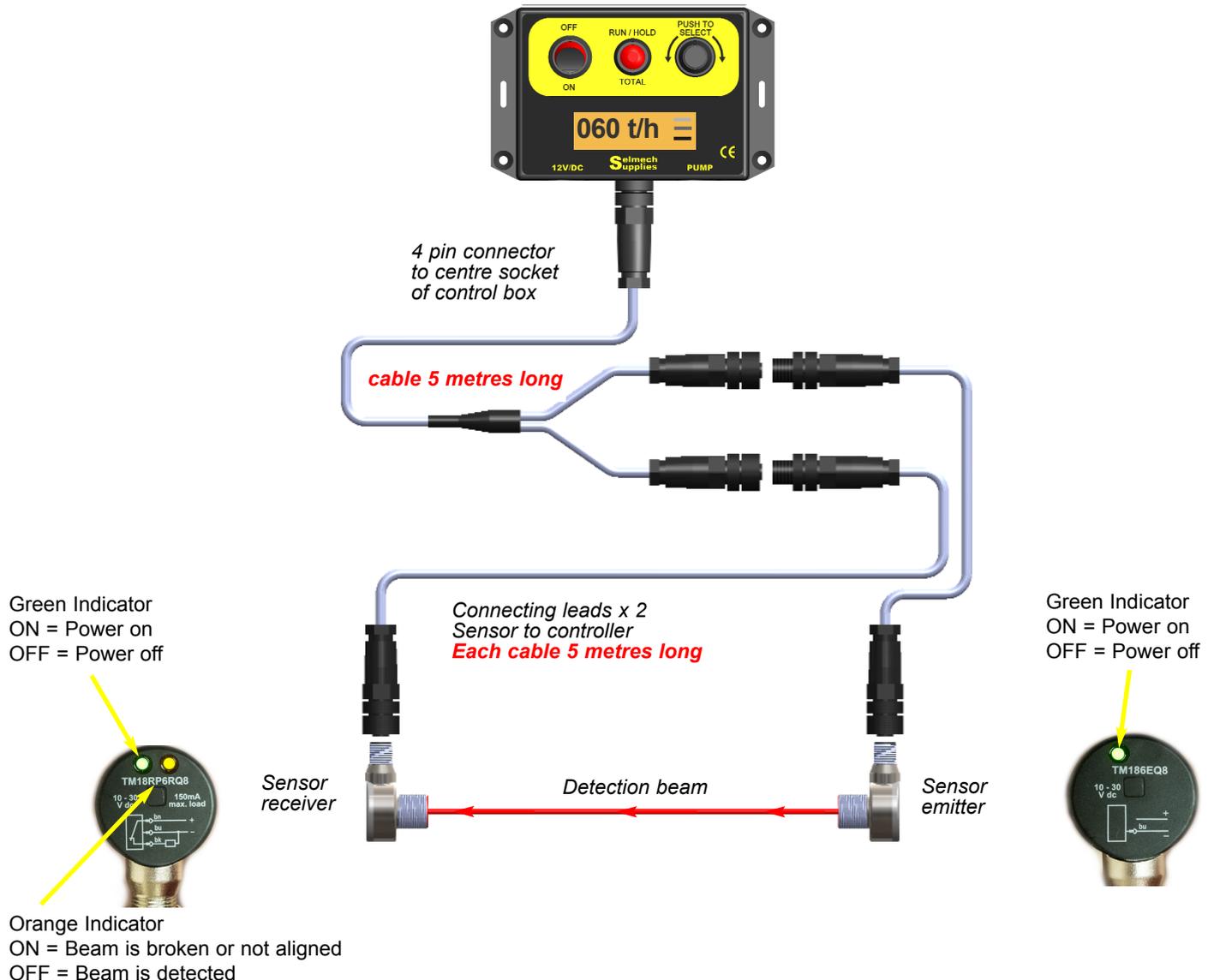
When there is no crop being detected the control box display will say NO CROP as below.

Unplugging the the crop detector will disable this function and the control box will work normally



Installation

The photoelectric sensors should be mounted so that they look across the point where you want the swath to be detected. For example at the point of the pick-up where the swath is transferred into the baler/forage wagon. There are two mounting brackets supplied. The sensor has a visible red LED to help alignment.



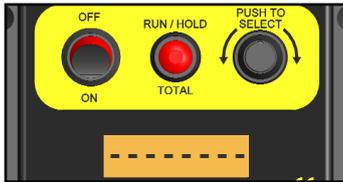
Extended operation

Changing Model

The control box is programmed with a range of models which are set before the applicator leaves the factory. If necessary the model can be changed.

How to change model

To change model you have to enter the the set-up routine by followig these instructions.



Press and hold down the "PUSH TO SELECT" Knob when at the same time turning the control box on. the display will first show "-----" but continue to hold in the "PUSH TO SELECT" Knob.

Continue to hold in the "PUSH TO SELECT" knob.



Continue to hold down the "PUSH TO SELECT" knob and after about 6 seconds the display will show "Set-up". but still continue to hold in the "PUSH TO SELECT" Knob down.

Continue to hold in the "PUSH TO SELECT" knob.



Keep holding down the "PUSH TO SELECT" Knob. until the display shows "SetModel". then release the "PUSH TO SELECT" Knob.

Release the "PUSH TO SELECT" knob.



With the model you require displayed press the "PUSH TO SELECT" knob once.



The display will now show "-SAVE-". before going into the run mode display.

The control box will now display the current model selected. At this point by turning the PRESS TO SELECT knob, clockwise and anti clockwise, you can change model. It is strongly recommended not to change the model, unless specifically told to, as this would change the current calibration that is used for this applicator. *The model options are: -*

NFS <i>Direct percentage drive to pump</i>	Ultralow <i>ultra low applicator 0.020 - 0.250 l/m</i>	Dflow UV <i>Digital SDP 0.100 - 1 l/m</i>	Dflow HV <i>Digital SDP 1.0 - 9.0 l/m</i>	Dflow LV <i>Digital SDP 0.5 - 5 l/m</i>
Pmstr SV <i>Digital Powder applicator 50-2000g/m</i>	Pmstr LV <i>Digital Powder applicator 10-150g/m</i>	Crimping <i>Digital Crimpmaster</i>	Ultra+ <i>ultra low applicator 0.050 - 0.500 l/m</i>	

Extended operation

Displaying the current software version

To show the control box software version hold down the RUN/HOLD/TOTAL button at the same time turning the control box on. the display will now show the current software version. The control box will start when the info button is released



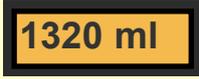
Displaying Diagnostic Mode

The control box has a Diagnostic Mode that can be useful for fault finding in the event of a problem with the applicator. This should only be used with the consultation of one of Selmech's engineers. *In Diag Mode the message DIAG appears occasionally.*

To enter the diagnostic mode do the following: -



With the control box switched on and in run mode press and hold down the “PRESS TO SELECT” knob. The calculated amount being dispensed will be displayed first. **(Releasing the knob now will revert back to run mode)**



Continue to hold the knob down and after a short time a series of dashes will be displayed



After approximately 5 seconds DiagMode will be displayed



Release the knob and an incremental count of pulses from the flow sensor will be displayed. It can count from 0 up to 600000



What does this mean: -

Firstly if it is counting up it shows that the flow sensor is registering pulses which means that fluid is flowing and being recorded. If the display is a series of zeros then it shows that the flow sensor is not registering any pulses which could mean there is no fluid flowing because the pump is not running or there is a blockage. It could also mean that the flow sensor is not working this could be because a wire has broken or that it has developed a fault.

Secondly it can be used to generate a calibration factor to enter in as a Manual Calibration as opposed to the Default Calibration. *Refer to the section “Generating and entering a custom calibration factor”*

Press and release the “PRESS TO SELECT” knob and next the current drive to the pump will be displayed as a percentage.



What does this mean: -

The percentage drive to the pump shows how hard the pump is being asked to work. This depends on the setting you have entered into the control box. If the percentage drive is 100% but your application rate is well within the maximum range of the pump it could mean that there is a blockage or the flow sensor is not sending a signal back to the control box. This would have showed up in the previous section with a zero count of pulses.

Press and release the “PRESS TO SELECT” knob and next the current supply voltage level will be displayed.



What does this mean: -

To get an accurate reading of voltage it should be done when the pump is pumping and with the harvester/tractor running!

The voltage displayed should be between 12.00 volts and 14.00 volts it would normally be 13.80 volts. If the voltage is low or erratic it could mean a bad connection anywhere from the battery to the pump. If the voltage is high there could be a problem with charging system of the machine.

The following diagnostics are only relevant if you have a thru beam crop detector connected

Press and release the “PRESS TO SELECT” knob and the display will show one of the following three options.



Two -- followed by CROP (-- CROP) indicates that there is no thru beam crop detector connected or that the control box is not seeing it. Check all connections are made properly and cabling for damage.

-- CROP

Two XX followed by CROP (XX CROP) indicates that the thru beam crop detector is not detecting any crop. If there is nothing breaking the beam then this shows it is working. If the beam is broken then it shows the there is a fault. Check all connections are made properly and cabling for damage.

XX CROP

Two ✓✓ followed by CROP (✓✓CROP) indicates that the thru beam crop detector is detecting crop. If there is something breaking the beam then this shows it is working. If the beam is not broken then it shows the there is a fault. Check all connections are made properly and cabling for damage.

✓✓ CROP

Press and release the “PRESS TO SELECT” knob and the display briefly show Exit Diag and returns to the Run Mode.

ExitDiag

Advanced Diagnostics

Displaying Advanced Diagnostics

The control box has an advanced Diagnostic Mode that provide additional diagnostics for Selmech's Engineers primarily used in development but availbale for advanced fault finding. *In Diag++ Mode the message DIAG appears ocasionaly.*

To enter the Diag++ mode do the following: -



Press and release the “PRESS TO SELECT” as per diag mode but continue to hold until Diag++ is displayed.

Diag ++

Release the “PRESS TO SELECT” knob and the calculated amount being dispensed will be displayed .

1320 ml

Release the “PRESS TO SELECT” knob and Elog 000 will be displayed. This “000” may be a number that relates to errors that have occurred

Elog 000

Elog is an error events log that records errors if they occur. These are assigned a decimal value that relate to an event and are as follows: -

Pause = 1, Crop = 2, Power fail = 4, Power Fail false alarm = 8, Flow Flag = 16, Low Fluid = 32, Runloop return = 64

Release the “PRESS TO SELECT” knob and 71 FLUID will be displayed .

71 FLUID

00 Fluid level signal

(Lower case font) - fluid = Bad

(Upper case font) FLUID = Good

Release the “PRESS TO SELECT” knob and 016 CROP will be displayed .

016 CROP

020 Crop sensor signal

Generating and entering a custom calibration factor.

If you find the application rate of the applicator not as accurate as you would expect there is a function in the control box to enter a custom calibration.

Each applicator is assigned, within the control box, a calibration factor to suit the flow sensor and pump combination. This is done in the set up routine by selecting the applicator model and choosing Def Cal (Default Calibration).

If your additive has a significantly different viscosity to water or your application rate is at the extremes of the flow sensor range you may want to enter your own calibration. This can be done by following these simple steps: -

Note: -

This procedure will be made a lot easier if carried out by two people as the pump lead will need to be removed at the appropriate time. This is necessary to stop the count without turning the control box off.

(limits still apply i.e. The combination of values entered by the user must fall within the parameters of the pump)

You will need a container that will accurately measure 1 litre. A good way to check the accuracy of your container is to use a balance to weigh 1 kilogram of water and mark the level on the container. *(1 kilogram weight of water equals 1 litre volume of water)*

Before you start.

Have your container ready to dispense into and a hose from the pump to dispense from.

Set the applicator running with the additive you are going to use at your target application rate.

Follow the instructions in the “**Extended operation**” Section to enter the Diagnostic Mode to the point where the incremental count of pulses from the flow sensor is displayed.

Incremental count of pulses from the flow sensor.

001345 P

Press and continue to hold the “PRESS TO SELECT” knob to zero the counts

000000 P

At the same time as you start to dispense into the container release the “PRESS TO SELECT” knob and the display will show the pulses being counted.

000045 P

When the level of liquid reaches the 1 litre mark unplug the pump lead from the control box to stop the count. Make a note of the reading. *(Record this number somewhere you may need it in the future)*

002300 P

Exit DiagMode and turn the control box off. Now go into “Set-up” refer to “**Setting the control box operation mode section**”.

Go through the set-up routine until you get to the the display “**Def-Cal**”. Turn the “PRESS TO SELECT” knob to display “**Man-Cal**”

Man-Cal

Press and release the “PRESS TO SELECT” Knob and CF followed by a number is displayed.

CF 02300

Turn the “PRESS TO SELECT” Knob and the number will change. continue turning the knob to enter the number that you recorded when carrying out the calibration.

CF 02300

Once you have entered the new calibration factor number continue through the set-up routine and exit.

Exit Yes

The new manual calibration number you have entered will be saved to memory and will remain there until it is changed or you revert back to Def-Cal. *Make a note of the Man-Cal number somewhere for future reference if needed.*

If at any time you want to revert back to the default calibration go through the set-up routine and select Def-Cal. **Note! this will overwrite the manual calibration number which will need to be re-entered if you want to use it again.**