



Selmech Supplies Dflow Powdermaster

USER MANUAL

The kit comprises:

*Applicator unit with mounting brackets - Digital in-cab control box - Low level indicator
- Power cable - Tubing - Litre measuring container*

Output Range:

Standard Volume Powdermaster (Pmstr SV) 50g - 2000g per minute depending on volumetric weight of additive.

Low Volume Powdermaster (Pmstr LV) 10g - 150g per minute depending on volumetric weight of additive.

Please read the instructions in full and always follow the guidelines set out by the additive manufacturer with regard to safety, mixing and application rates.

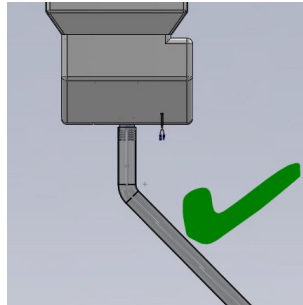
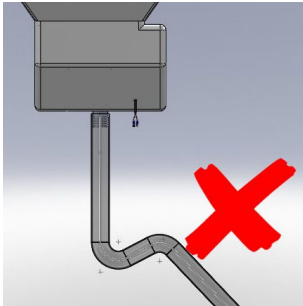
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Installation

Mounting the applicator

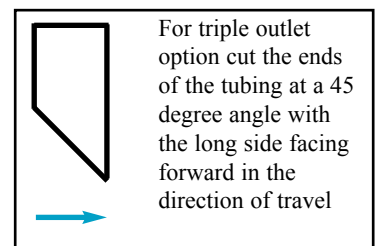
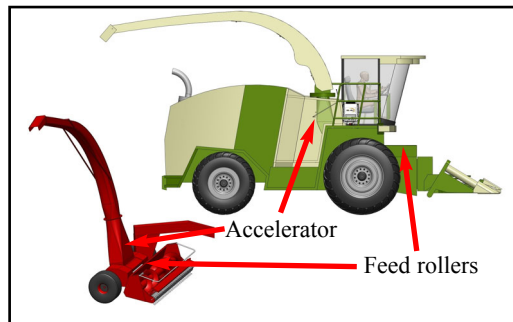
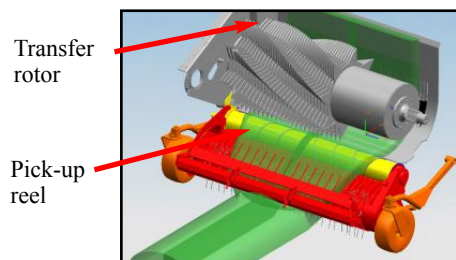
1. Mount the Powdermaster applicator unit upright using the mounting brackets, the brackets are held in place with M8 x 12 bolts. Ensure the mounting surface is secure and will support the weight of the tank when full, up to (80kg). Unless using the Blower Attachment the additive is gravity fed down the tubing so mount it higher than the application point.
4. Cut delivery tube to required lengths and attach the delivery tubing to the hose tails at the base of the applicator DO NOT kink or dress the tubing up hill.
5. Run the cable from the applicator to the control box in the cab.
6. Install the digital control box in the cab and connect as per the **OSD Digital Control Box** instructions in following sections.



Application point

The application point will depend on the machine you are fitting to. Typically for a forage harvester this would be the base of the chute behind the accelerator or over the feed rollers.

If fitting to forage wagon or baler the application is normally delivered through 3 tubes either over the transfer rotor or over the pick-up reel.



Harvesting rate

In order to set the control box accurately you will need to know the harvest rate of your machine. This will either be entered in tonnes/bale per hour or grams of additive dispensed per minute depending on how you set up your control box.

For example if you collect 2 tonnes of grass in 1 minute your harvest rate = 2 tonnes per minute times by 60 = 120 tonnes per hour.

If setting your application rate in grams per minute (g) and your required application rate is 300 grams/tonne you would need to apply 600 g

Volumetric weight of your additive

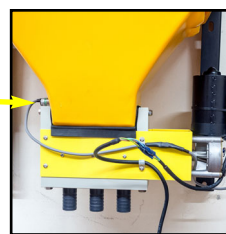
To accommodate the different types of carriers used in the manufacture of powder or granular additives the Dflow Powdermaster has a volumetric calibration feature that enables the you to calibrate the applicator to suit your preferred additives. Refer to the “**Calculating the volumetric weight of your additive**” section for instructions on how to do this.

Low Level indicator

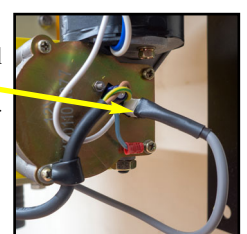
The Dflow Powdermaster is fitted with a low level sensor. when the level of the powder falls below the sensor a warning message “POWDER LOW” is displayed on the in-cab control box and an audible alarm will sound. Unplugging the low level sensor from the connector on the motor will disable this function and the control box will work normally.



Low level sensor



Low level sensor connector



The control box

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

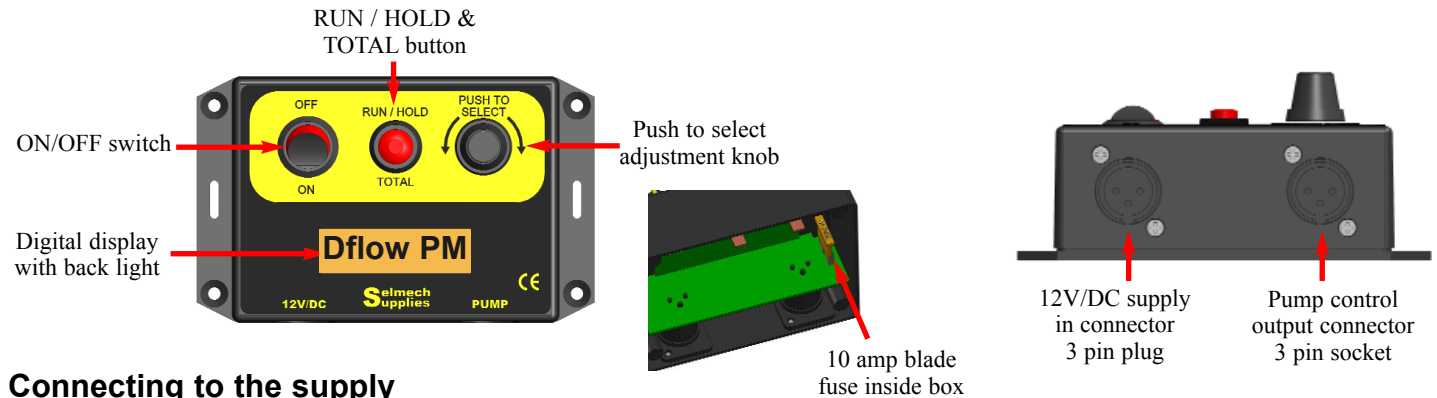
Overview

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.



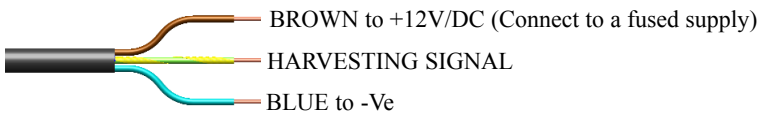
Connecting to the supply

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 Kilograms 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 can be supplied with the correct "calibration factor" and "volumetric weight" set for your additive. But if not refer to the "Calculating the volumetric weight of your additive" and "Setting the control box operating mode" sections in this manual.

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!

Pmstr SV

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**

Auto

Manual

Baler

Harvesting rate (t/h).

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

060 t/h

300 g/t

80 b/h

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.)

-Pause-

Calculating the volumetric weight of your additive

To accommodate the different types of carriers used in the manufacture of powder or granular additives the Dflow Powdermaster has a volumetric calibration feature that enables you to calibrate the applicator to suit your preferred additives.

What is Volumetric Weight?

In this case the volumetric weight is the weight of 1 litre in volume of the granular/powder additive.

How to find the Volumetric Weight of your product

With the Powdermaster we have supplied a container which when full measures 1 litre in volume. You will also need a set of scales capable of weighing the container full of additive reasonably accurately. Kitchen scales for example. *If using your own container it should be weighed and this figure subtracted from the final reading.*

The weight of the container provided is 40 grammes, this should be deducted from your final reading.

- 1) Fill the litre measuring container supplied with your additive so that it is level with the top.
- 2) Zero your scale and place the container on it.
- 3) Take the reading, writing it down here for future reference.

Your volumetric weight



Supplied container



Fill the 1 litre container



Level to the top of the container



Zero your scales



Place filled container on scales



Take the reading and record it

The volumetric weight is entered into the control box in kilograms so if your balance read out, like the one in the example here, is in grammes you need to remember to convert it to kilograms. The weight (40g) of the container should also be subtracted from the reading.

In this example the reading is 670g. Subtracting the weight of the container, 40g, from the figure would result in a figure of 630g. Converting this figure into kilograms would give you 0.63kg which would be the figure to be entered into the control box.

NOTE! This is just an example and your reading will likely be different.

The reading you have taken is the volumetric weight of your product. This will be used in the next section “**Setting the control box operating mode**” where you will follow the instruction to select “**Man--VW**” and enter your reading.

Note: If you use different product you will need to find the volumetric weight for each and enter that when you change product.

Setting the control box operating mode

How to setup the control box

This only needs to be done if you want to change the operation set-up of the control box



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.



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



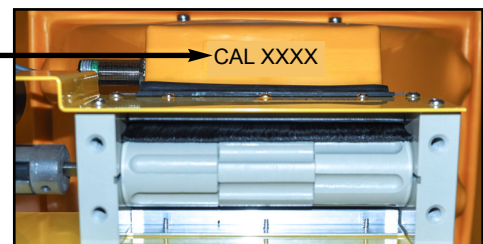
Applying a calibration factor

The display will now show “Def-Cal” or if the default calibration has been changed **Man-Cal**. This applies the calibration value for the current model.

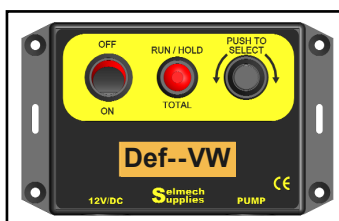
Turning the “PRESS TO SELECT” knob changes between displaying “Def-Cal” or “Man-Cal”. With “Man-Cal” displayed pressing the “PRESS TO SELECT” knob will then display the calibration factor which can be changed by Turning the “PRESS TO SELECT” knob to fine tune the accuracy of the output if necessary. *(This should only be changed if specifically instructed.)*

The calibration factor that the unit is sent out with can be found on a sticker on the hopper above the feed rotor assembly - As shown in the photograph below.

Calibration
sticker



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



Entering the Volumetric Weight (VW) of your additive

The display will now show “Def--VW”. This applies a default volumetric weight value. Unless you know that the volumetric weight of your additive has been pre-set you will need to enter it manually.

By turning the “PRESS TO SELECT” knob you will display “Man--VW” to manually enter a volumetric weight. With “Man--VW” displayed press the “PRESS TO SELECT” knob and the previously set vw is displayed “vw 0.65” for example! By turning the “PRESS TO SELECT” knob this figure can be changed to that of the volumetric weight of your additive. Refer to the “*finding the volumetric weight of your granular additive*” section for instructions of how to do this.

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

Setting the control box operating mode continued

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.



HOLD MODE

Enable (Y) Disable (N)

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.



TOTAL COUNTS

Enable (Y) Disable (N)

If you do not want to view the total Kilograms 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 three times before 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.

Set the control box for harvesting

Auto mode

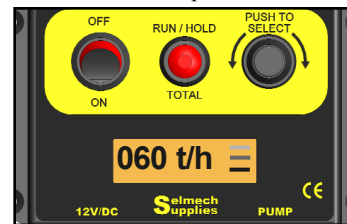
Enter the application rate in grams per tonne.



Press the “PUSH TO SELECT” knob to display the application rate in grams per tonne (g/t). Rotate the knob to set your application rate.

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

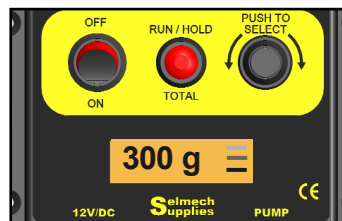
Set your harvesting pick-up rate in tonnes per hour



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 in grams per minute



In Manual Mode the output is set in grams per minute. (g)

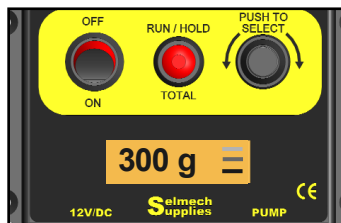
Baler mode

Set your bale weight in Kg per Bale



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 in grams per tonne.



Press the “PUSH TO SELECT” knob again to display the application rate in g/t. 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

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 grams per minute (g)



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 g* 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. 0000.00 will be displayed and after a few seconds the display will always revert to showing t/h or g

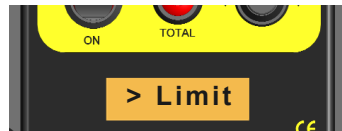


Warning messages

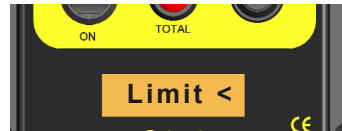
Warning message - LIMIT

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 - POWDER LOW

There is a low level switch fitted. When the level of the powder falls below the switch a warning message is displayed saying POWDER LOW. An audible alarm will also sound. Unplugging the low level switch from the plug on the motor will disable this function and the control box will ignore the function.



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

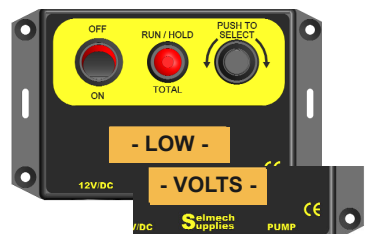
A warning message "CHECK FLOW" can be displayed until the set flow rate is achieved. An audible alarm will also sound.

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 speed sensor the applicator can be run in NFS mode. In this mode the control box ignores the speed 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.

Press the “PUSH TO SELECT” knob once.



Selecting NFS mode

*The control box will now display the current model “DflowPM”. 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

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

Set output rate of the applicator in % drive to motor



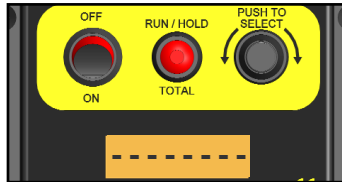
Extended Operation

There are two Dflow PowderMaster models that, depending on the additive used, have different output ranges. The standard PowderMaster has a typical output range of 50 to 2000 grammes per minute. There is also a low volume option that has a typical output range of 10 to 150 grammes per minute.

The control box can be set up to work with both but would normally be delivered set with the correct model. You should only change model if you have been instructed to do so otherwise the applicator will not dispense the correct amount.

How to change model

The control box is programmed with a range of models which are set before the applicator leaves the factory. To change model you have to enter the the set-up routine by following 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>	

The two Powder Master model options are:-

Pmstr SV that has a typical output range of 50 to 2000 grammes per minute
Pmstr LV that has a typical output range of 10 to 150 grammes per minute

Powdermaster Blower Attachment Option

The Powdermaster blower attachment is supplied as a kit that can be easily fitted to the Powdermaster applicator. A wiring loom is included that enables the electrical connections to be made via a switching control circuit to synchronise the operation of the blower with the Powdermaster.

The blower assembly can be mounting so that the pipe outlet is in a left or right direction. It can be fitted to both 50kg or 80kg Powdermaster, with digital and non digital controller.



The thru beam crop detector option

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.

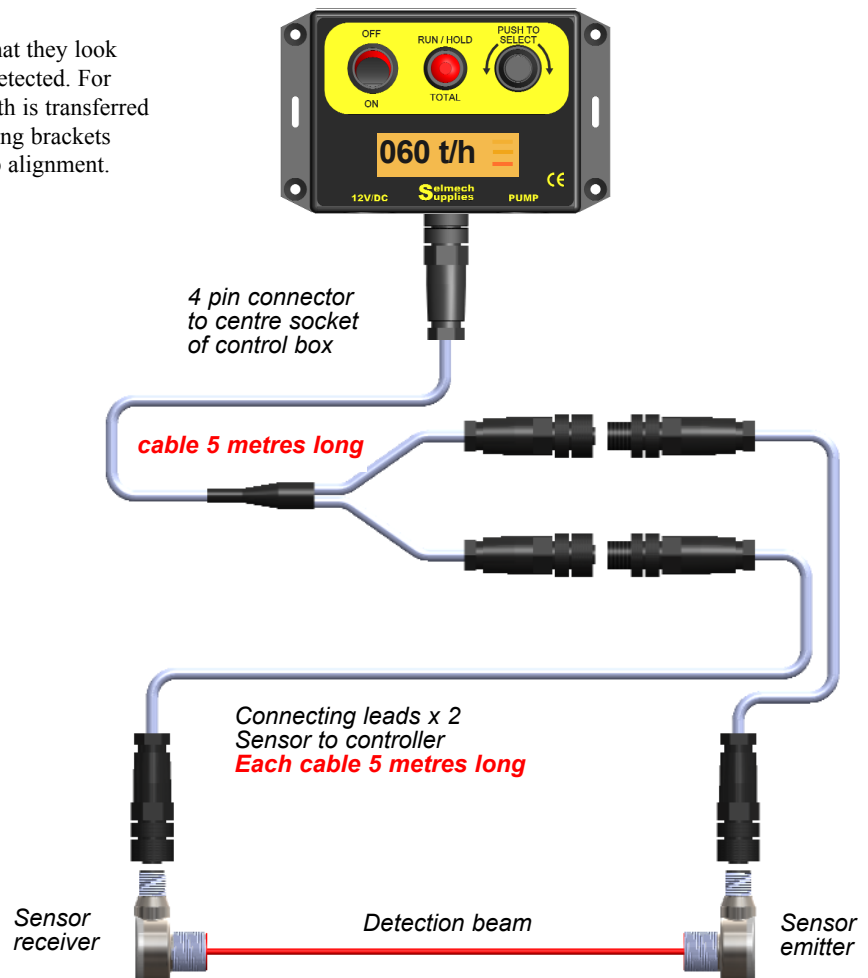
When there is no crop being detected the control box display will say NO CROP as below.

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.



Maintenance

Cleaning

To ensure the applicator runs trouble free we recommend that it is cleaned regularly to prevent the build up of old additive around the feed rotor and or low level sensor.

The inside of the hopper should be kept dry and moisture will prevent the additive from flowing freely causing it to bridge

The applicator should not be stored for long periods with additive in it.

To be able to clean the inside of the hopper around the low level sensor and the rotors removed the baffle plate to allow access to these parts.



Take off the motor cover to gain access to the screws holding the baffle plate and remove it. The low level sensor and base of the hopper can now be cleaned more easily. After cleaning replace the baffle plate and motor cover.

Adjusting the sensitivity of the Low Level Sensor

If the control box displays the message “POWDER LOW” when there is additive in the hopper covering the low level sensor or it does not show this message when the hopper is empty then you may need to adjust the sensitivity of the sensor.

To reset the sensor the hopper should be empty, and no additive debris on the sensor but with the applicator running and not in hold/pause.

The adjusting screw requires a 5/64 inch flat blade screwdriver to adjust the low level alert sensor.

Access to the adjustment screw can be gained by removing the cover or if that is not possible through the hole in the motor cover after removing the grommet, shown below.

Unplugging the low level sensor from the connector on the motor will disable it and the control box will work normally.



Low level sensor access hole



Remove grommet



Low level sensor

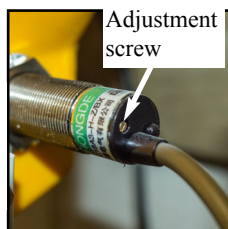


Adjust as shown below

How to adjust the sensitivity of the Low Level Sensor

1

Look at the back of the sensor, next to its cable is a small screw. Turning this clockwise makes it more sensitive and counter clockwise less sensitive.



2

Use a 5/64 inch flat blade screwdriver to adjust the sensitivity screw.



3

Turn the screw on the sensor clockwise until the sensor red light is always on.



4

Then, slowly turn the screw counter clockwise until the light turns off. Continue for half a turn more and this will then set the sensor to the correct level of sensitivity.



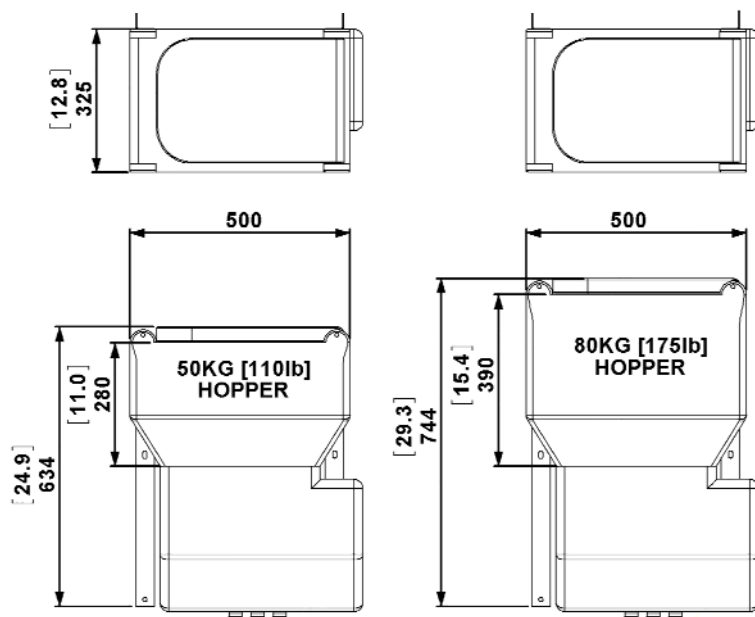
The red light should be on when there is additive covering the sensor and off when there is not

Troubleshooting

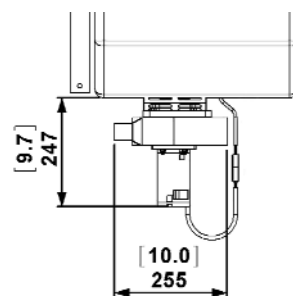
Fault	Diagnosis	Remedy
Motor will not run	Control box or in line connector not connected or plugged in fully	Check all connector are fully pushed in to their mating halves Check power supply wiring
	Fuse blown	Replace fuse – check for reasons for blown fuse before restarting.
Motor runs but poor output	Wrong application rate due to wrong calibration or volumetric weight.	Go to “Setting the control box operating mode” and check the calibration and volumetric weight are set correctly
Motor runs but no output	Defective motor	Contact Selmech Supplies
	Hopper empty	Fill hopper
	Tubing kinked	DO NOT kink or dress the tubing up hill
	Motor coupling worn or broken	Check to see if feed rotor turns
	Feed rotor blocked	Clear feed rotor
	Additive bridging in hopper	Make sure additive can flow freely and is not damp
“POWDER LOW” displayed on control box	Hopper empty	Fill hopper
	Low level sensor need re adjusting	Adjust the sensitivity of the Low Level Sensor
	Low level sensor faulty	Unplug low level switch from tag board on motor
Hopper empty but control box does not display “POWDER LOW”	Low level switch clogged in additive	Clean the low level switch
	Low level sensor need re adjusting	Adjust the sensitivity of the Low Level Sensor
Additive runs out even when motor is not running	Feed rotor brushes worn or clogged up with old additive	Change feed rotor brush set
The out-put does not seem to be correct for the values entered	calibration factor may be incorrect	Reset the cal factor in the setting the control box routine Def-Cal should be selected.
“CHECK FLOW” displayed constantly	Low voltage.	Check supply voltage is good
	Feed rotor jammed. Deflective motor.	Check feed rotor is turning OK.
	Control box settings outside of limits	Refer to Warning message - LIMIT in user manual

Technical Details

Powdermaster Overall Dimensions



Blower Dimensions



Technical data	POWDERMASTER	BLOWER
Supply Voltage	12V/DC (10.6V DC to 16.4V/DC)	12V/DC (10.6V DC to 16.4V/DC)
Current consumption	2.8A	11.5A
Fuse rating	5A	15A
Output signal to motor	PWM approx 1.4 KHz	<i>The fan power supply is completely independent of the applicator and the fan does not draw power from the applicator.</i>
Capacity of the hopper	50 kg or 80kg	
Output range Standard Volume	50g to 2000g per minute	
Output range Low Volume	10g to 150g per minute	

Warranty

Provided installation is carried according to these instructions a warranty of 1 year from date of delivery applies. This covers faulty manufacture only and does not cover wear and tear through normal use or mechanical or chemical damage that has occurred to parts through misuse or unauthorised attempts to repair the unit. In the case of faulty manufacture, claims are limited to repair of the unit and its return to the customer.

Photos of some Powdermasters mounted on balers



Determining your Harvest Rate

1. Find the chart for your application.

2. By reading across, find the weight of your bale or load.

If the weight of your bale or load is not listed, please round up to the next weight listed.

3. By reading down, find the time to make a bale or load/unload.

If the exact time to make your bale or load/unload is not listed, please round up to the faster time listed.

4. After locating your Harvest Rate, multiply this by your product application rate per ton. This will provide you with your overall application rate.

Silage - Tons per Minute

		Tons per load											
		4	6	8	10	12	14	16	18	20	22	24	26
Minutes to Load/Unload	10	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6
	9	0.4	0.7	0.9	1.1	1.3	1.6	1.8	2.0	2.2	2.4	2.7	2.9
	8	0.5	0.8	1.0	1.3	1.5	1.8	2.0	2.3	2.5	2.8	3.0	3.3
	7	0.6	0.9	1.1	1.4	1.7	2.0	2.3	2.6	2.9	3.1	3.4	3.7
	6	0.7	1.0	1.3	1.7	2.0	2.3	2.7	3.0	3.3	3.7	4.0	4.3
	5	0.8	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4.0	4.4	4.8	5.2
	4	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5
	3	1.3	2.0	2.7	3.3	4.0	4.7	5.3	6.0	6.7	7.3	8.0	8.7
	2	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0
	1	4.0	6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0	22.0	24.0	26.0

Small Square Balers - Tons per Hour

		Weight per Bale (in Pounds)							
		45	50	55	60	65	70	75	80
Seconds to Make a Bale	10	8.1	9.0	9.9	10.8	11.7	12.6	13.5	14.4
	11	7.4	8.2	9.0	9.8	10.6	11.5	12.3	13.1
	12	6.8	7.5	8.3	9.0	9.8	10.5	11.3	12.0
	13	6.2	6.9	7.6	8.3	9.0	9.7	10.4	11.1
	14	5.8	6.4	7.1	7.7	8.4	9.0	9.6	10.3
	15	5.4	6.0	6.6	7.2	7.8	8.4	9.0	9.6
	16	5.1	5.6	6.2	6.8	7.3	7.9	8.4	9.0
	17	4.8	5.3	5.8	6.4	6.9	7.4	7.9	8.5
	18	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0
	19	4.3	4.7	5.2	5.7	6.2	6.6	7.1	7.6
	20	4.1	4.5	5.0	5.4	5.9	6.3	6.8	7.2

Large Square and Round Balers - Tons per Hour

		Weight per Bale (in Pounds)							
		600	800	1000	1200	1400	1600	1800	2000
Minutes to Make a Bale	0.5	36.0	48.0	60.0	72.0	84.0	96.0	108.0	120.0
	1.0	18.0	24.0	30.0	35.0	42.0	48.0	54.0	60.0
	1.5	12.0	16.0	20.0	24.0	28.0	32.0	36.0	40.0
	2.0	9.0	12.0	15.0	18.0	21.0	24.0	27.0	30.0
	2.5	7.2	9.6	12.0	14.4	16.8	19.2	21.6	24.0
	3.0	6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0
	3.5	5.1	6.9	8.6	10.3	12.0	13.7	15.4	17.1
	4.0	4.5	6.0	7.5	9.0	10.5	12.0	13.5	15.0
	4.5	4.0	5.3	6.7	8.0	9.3	10.7	12.0	13.3
	5.0	3.6	4.8	6.0	7.2	8.4	9.6	10.8	12.0

Conversion Chart

Approximate US to Metric Equivalents

Pounds to Kilograms

Bale weight in Pounds	Bale weight in Kilograms
Small Bales	
45	20
66	30
88	40
110	50
Big Bales	
400	180
600	270
800	360
1000	450
1200	540
1400	630
1600	700
1800	800
2000	900
2200	1000
2400	1100
2600	1180
2800	1270
3000	1360

Ounces to Grams

Ounces per Ton	Grams per ton
1	30
1.4	40
1.8	50
2	60
2.5	70
2.8	80
3.2	90
3.5	100
3.8	110
4.2	120
5	140
6	170
7	200
8	230
9	260
10	280
11	310
12	340
13	370
14	400
15	420
16	450
17	480
18	500

Fluid Ounces to Millilitres

US fluid Ounces	Millilitres
0.3	10
0.6	20
1.0	30
1.3	40
1.6	50
2.0	60
2.3	70
2.6	80
3.0	90
3.3	100
3.6	110
4.0	120
4.3	130
4.6	140
5.0	150
5.3	160
5.6	170
6.0	180
6.3	190
6.6	200
7.0	210
7.3	220
7.6	230
8.0	240

