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Agriculex
ESC2-TSR Programmable Electronic
Seed Counter
Operator's Manual



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1. Introduction to ESC2-TS Seed Counter

1.1 Introduction

The ESC2-TSR seed counter is a touch screen, high speed and high accuracy seed counter. It was specially designed to provide easy use, count data manipulation more secure and protection against unexpected power loss and consequence potential loss of count data. It also provides wireless connection as well as counter customizing setting as request.

Basically, understanding how the ESC2-TSR works will benefit the operator to efficiently use this seed counter and help with troubleshooting.

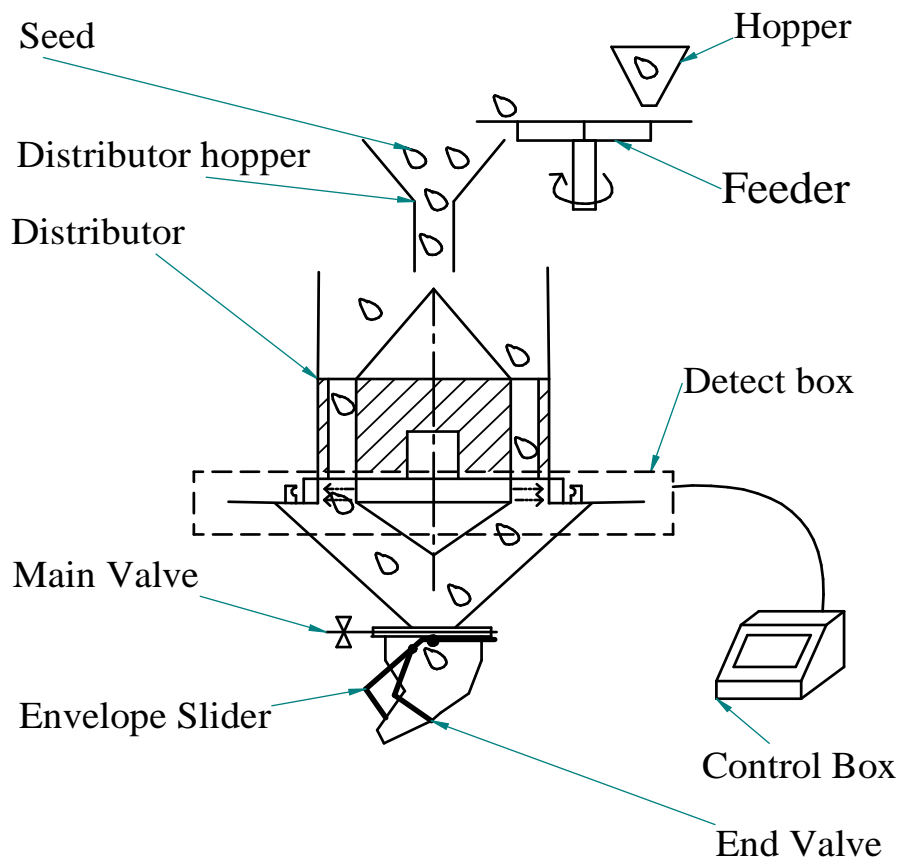


Figure 1.1

Figure 1.1 conceptual presents how ESC2-TSR work. Feeder turntable delivers seed to Distributor through Distributor hopper. The cone positioned the top of the distributor dispenses seed to 16 channels which circling along with distributor. Each channel is detected by each sensor. As a seed drop through the channel, the sensor will detect it and send signal to control box. The control box will send a corresponding command to the counter according to count mode and setting. After the counter received command, it will take associated action with command.

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As the seed drops through the channel, it will go through a valve referred to as **Main Valve**, which is controlled by the control box. If the Main Valve is in close state, the seed will be held in the top container. If it is in open state, seed will flow into the second container and is stopped by a gate, referred to as the **End Valve**. The End Valve is controlled by a sliding bar which is positioned on top of the discharge chute in the counter. This sliding bar is referred to **Envelope Slider**. Lift Envelope Slider, the End Valve will be opened and an open message be sent to the control box. When control box received this message, a corresponding command will be sent to counter for opening or closing Main Valve during '*batch mode*'.

We have tried to make the operation of the counter as user-friendly as possible, with the goal that it should be possible to use without even referring to this manual. We would encourage you to experiment with the control unit before formally using it. With many things there are several ways to do them. We have tried to present you with ways to do all the things that you might want to do at any point in the program. For example; when you set up a program for each batch count you will be asked to enter a feed speed. Don't worry if you are not sure which speed should be set for counting. Just press the '*OK*' button to select the default setting.

The only thing(s) you need to keep in mind before counting are the following:

1.2 Sensitivity

The range of sensitivity is 0 to 10. 10 is the least sensitive and 0 is the most. This number roughly corresponds with the size of seed (in mm) for which that setting is appropriate. For example; Canola – the sensitivity can be set from 0.8 to 1.5. The sensitivity is controlled by the sensitivity knob. However, if the setting is unnecessarily sensitive, it increases the possibility that the counter will count dust, chaff, or electrical noise.

1.3 Vertical and Horizontal Gate

The feeder unit has two gates that need to be manually and correctly set before counting. One is referred to as the '*Vertical Gate*' placed at front of the feeder unit and the other is referred to as the '*Horizontal Gate*' placed at right side of the feeder unit. The size setting of the gates depends on the seed size and desired count speed. When setting these gates, ensure that the seed will be feeding continuously without jamming the feed turntable. You may need to experiment a bit to find the best setting.

1.4 Turntable Speed

The counting speed is controlled by the feed turntable speed and the size of gates. The speed range of the feed turntable is from 0 to 200. 0 is at standstill and 200 is the fastest speed. The feed turntable speed is controlled by software and can be pre-set and changed during counting.

1.5 Barcode

Barcode is divided into two categories: Sample barcode and Packet barcode.

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Sample barcode consists of a sample ID referred as Source_ID or another name. Please contact us if you want to add more information in the Sample barcode.

A sample barcode Example as following

one dimension, code-128 format barcode and 2 dimensions data matrix barcode:



And



Where: JY2EG135PU01 is Sample ID.

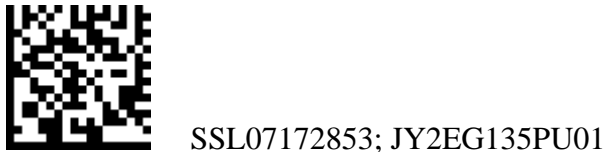
Packet barcode consists of a packet ID, delimiter and a sample ID or only Packet ID.

A Packet ID barcode as following:

Example 1: one dimension, code-128 format barcode and 2 dimensions data matrix barcode:



And



Where:

SSL07172853 is packet ID,

JY2EG135PU01 is sample ID,

‘;’ is delimited symbol

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Example 2: one dimension, code-128 format barcode and 2 dimensions data matrix barcode:



And



Where:

SSL07172853 is packet ID

The software will automatically distinguish which Packet ID you input.

2. Quick Installation & quick start

Thank you for choosing ESC2-TSR Seed Counter. This Quick Installation & quick start will provide setup instructions and quick start guide. For Detailed information refer to another chapters

2.1 Quick installation

2. 1.1 unpack

Box Contents:

- Control unit
- Feed unit
- detector unit
- seed distributor unit
- Base unit
- Wireless antenna
- Large size seed spout
- Small size seed spout
- Operator's manual.
- Warranty Sheet

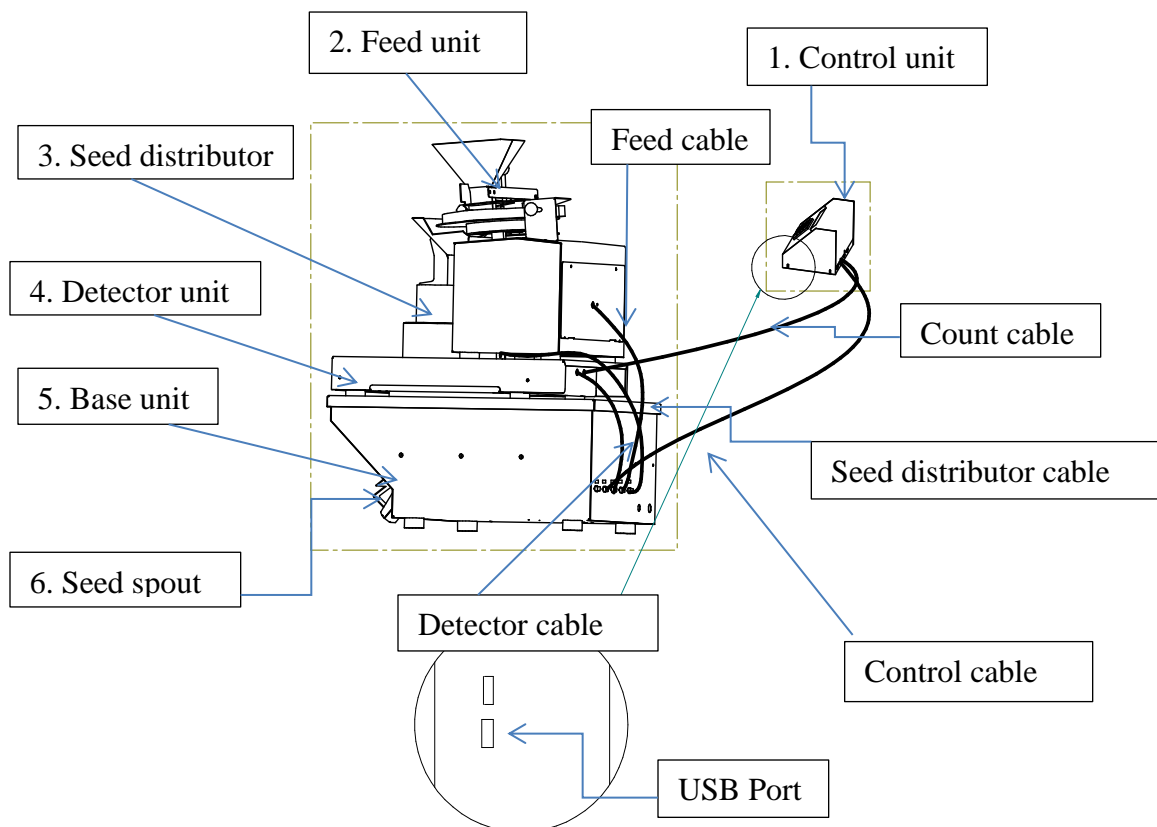


Figure 2.1 Esc-2 Seed Counter Setup Demo Figure

2.1.2 Setup & Connect Counter

- It is recommended to turn off the power before connecting or disconnecting all cables.
- Setup all parts of 'ESC2-TSR Seed Counter as shown at Figure 2.1 (page 7) and connect all cables to each associative port.
- Turn on the power. The Counter will take about 20 seconds to boot up.

2.2 Quick start

Turn the power switch on, Main Frame will appear on the whole screen as shown at figure 2.2.1

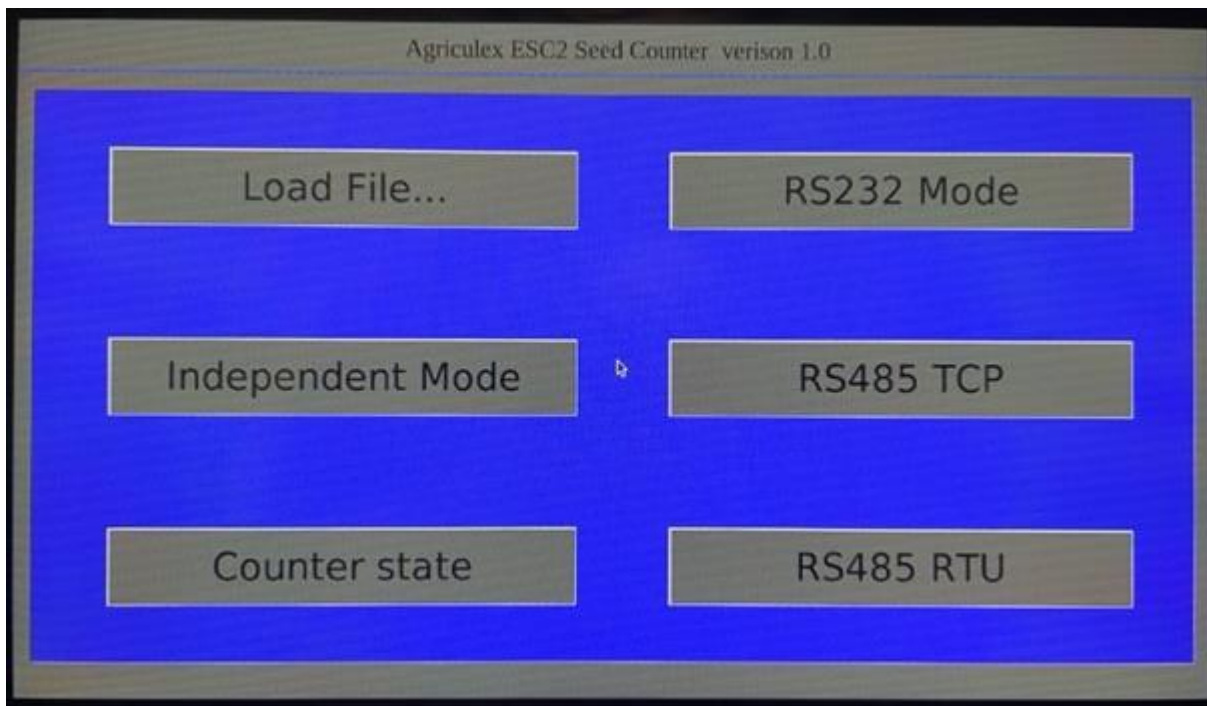


Figure 2.2.1

Main Frame is the start point of the program. All the counting action will start from here. Main Frame consists of Load file..., Independent Mode, Counter state, RS232 Mode, RS485 TCP and RS485 RTU.

For quick start, we only focus on Independent Mode here. Other function will describe on the other section.

- Click Independent Mode, the interface will change to Independent Mode as shown at Figure 2.2.2
- Select count mode: Totalize or Batch. The default setting is Totalize count
- Click Crop button (the label of Crop button was default set to Corn) to select crop
- Manually to set sensitivity, gate size in the counter machine. for example, Corn, Sensitivity set to 5.

The horizontal gate: 16, Vertical gate 12

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The detail information refers to the section 1.3 to 1.4 at page 4

- Click Speed button to set speed. For example, Corn, speed set to 50. The details refer to the section 1.5 at page 4
- Click Start button to count
- Click Done button if count finished or lift Envelope slide bar
- Click Home to exit

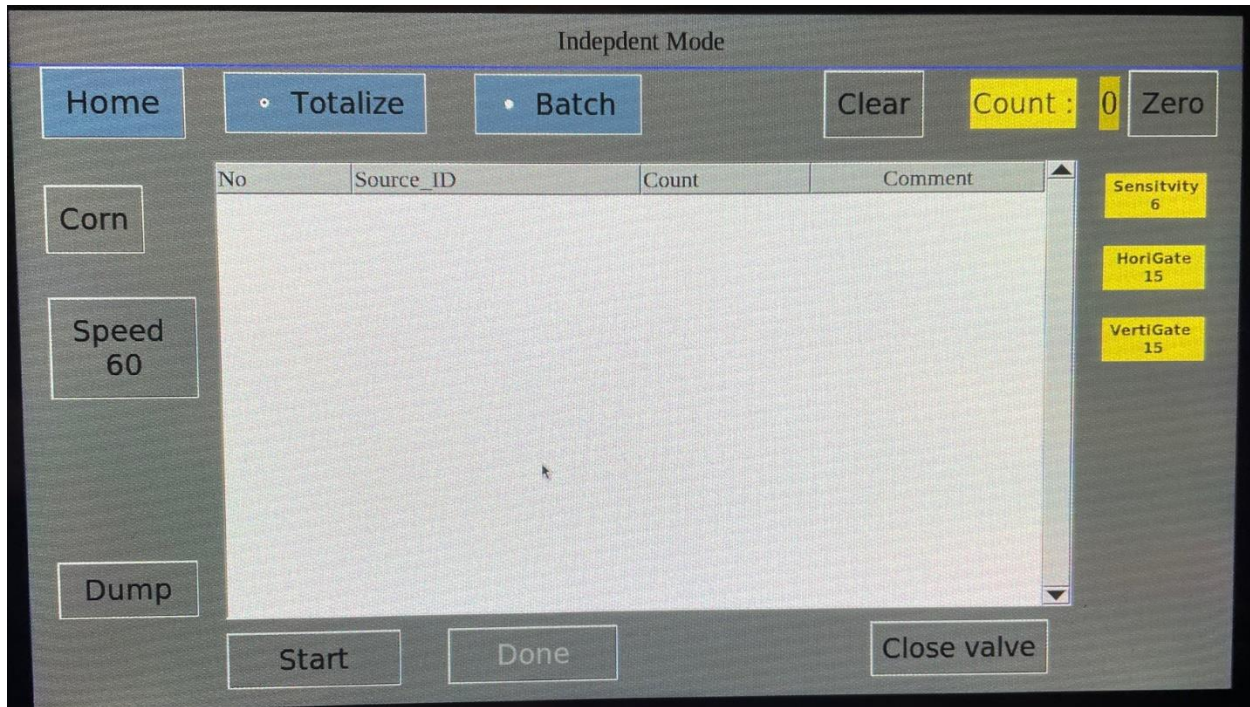


Figure 2.2.2

2.3 Turn off Counter Power

Turn off power toggle switch off, the power will off in the counter and the software in the control box will shut down by software properly.

3. Independent Mode

Under this mode, barcode scanner not required. If the count data need to be stored, a USB memory stick is required. The counter will automatically assign a Source_ID for each count.

- **Home** button: click this button, the counter will ask whether to save data then exit Independent Mode. Note that: the data can only be saved to USB memory stick
- **Totalize** button: Click this button, the counter will conduct a totalize count
- **Batch** button: click this button, the counter will conduct a batch count
- **Clear** button: click this button, all counter data listed in the window will be removed.
- **Zero** button: click this button, the count number will be set to Zero
- **Crop** button (default was set to Corn): click this button, operator can select, edit crop
- **Speed** button: click this button to set the speed of the counter
- **Dump** button: click this button to dump out the seed from the hopper
- **Start** button: click this button to start count.
- **Done** button:
 - Totalize mode: Done button is at the state of inactivate before Start button was clicked. Click Done button, the counter will terminate totalize count. To lift Envelope slide bar, the counter will also terminate totalize count.
 - Batch mode: Click Done button, the counter will terminate batch count.
- **Close Valve** button: this button is available only in Totalize mode. Click this button, the valve inside counter will close, click again, the valve will open
- **Yellow color label**: these labels cannot be manipulated by software. The purpose is to reminder of counter setting

3.1 Totalize Count

Click Start button, the counter will start to count. The label on the Start button will change to Pause, click Start button again, the counter will stop to count. Click Start button once more, the counter continues to count. Click Done button or lift Envelope slide bar, let software know totalize count has finished. The data will be record as shown at figure 3.1.1

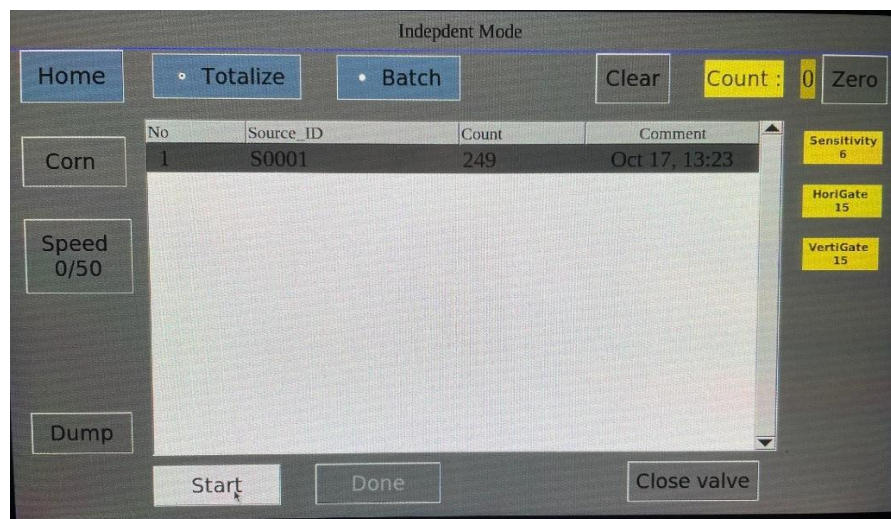


Figure 3.1.1

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3.2 Batch Count

Click Batch button, the batch count window pops up as shown at figure 3.2.1

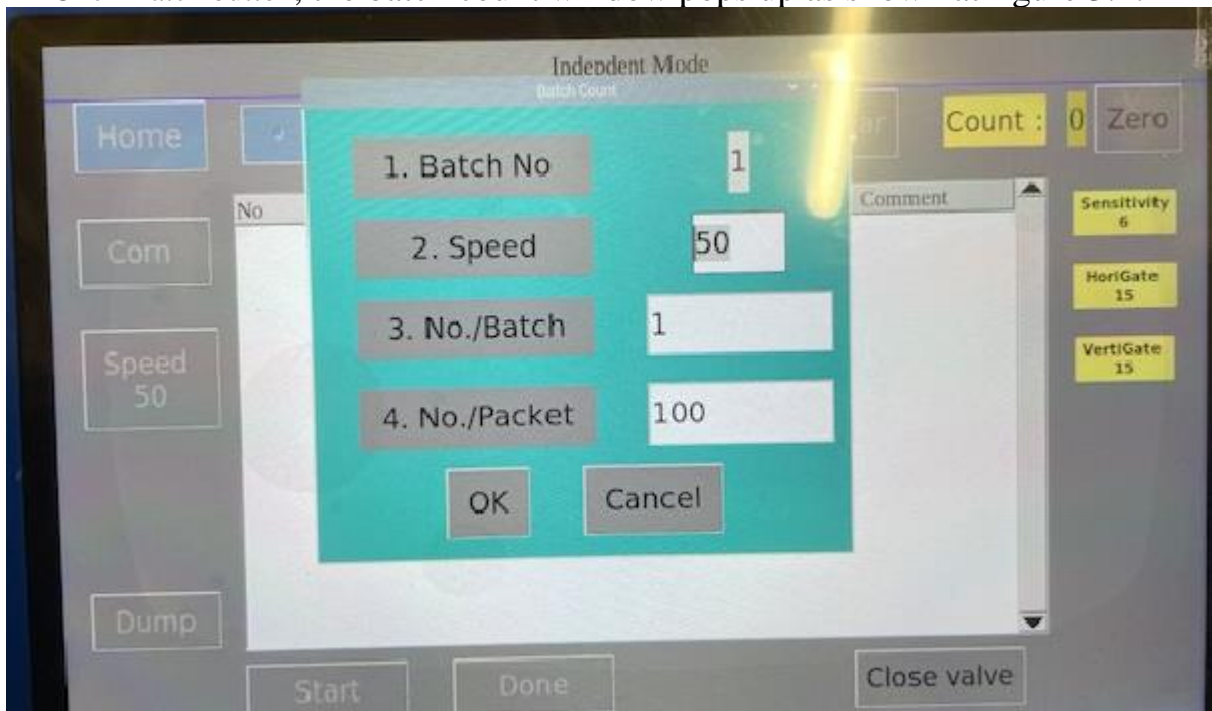


Figure 3.2.1

If batch number or Packet number is not the same as default setting, just click and Batch count window will expand as shown figure 3.2.2

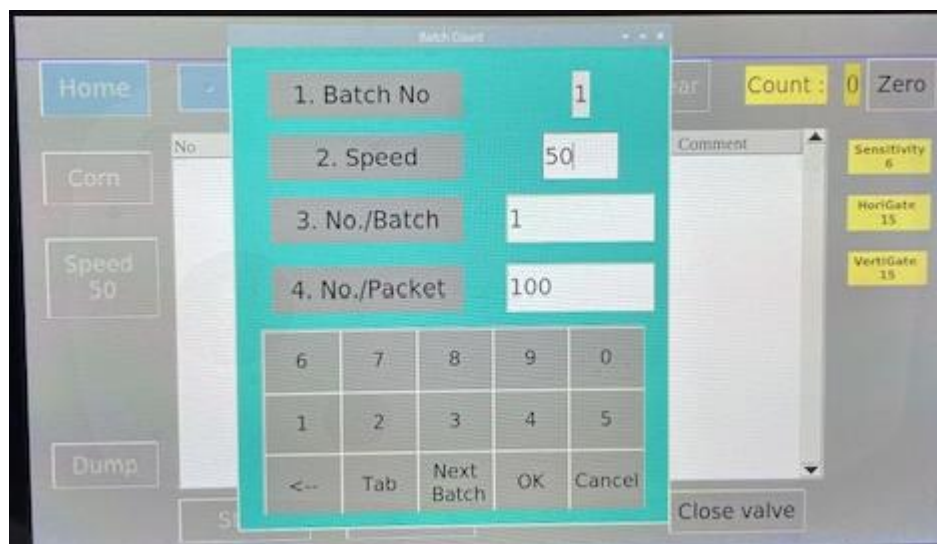


Figure 3.2.2

Click OK button, the counter starts to count.

The following figure is 2 batch counting set. first batch: 1 packet, 100 kernel/package, counting speed is 50; second batch is 2 packages, 50 kernel/package and counting speed is 60.

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Figure 3.2.3

After finishing batch count, the extra seed remained in the hopper will be automatically dumped out, after that, the counter will repeat last batch count again. Click Done button will terminate the batch count and click Next button to set a new batch count.

The following figure 3.2.4 is an example and each column will be explained as below

No	Source_ID	Packet	No/Package	Remainder	Comment
1	S0001	1/1	100		complete
2	S0002	2/2	60	161	Oct 17, 14:2
3	S0003	1	100/161	null	partial
4	S0003	1	100/0	null	null

Figure 3.2.4

Source_ID: the counter will automatically generate an id for each batch count

Packet: 2/2 means 2 packets and the counter actually counts 2 packets. 2/3 means the counter only count 2 packets but we need count 3 packets.

No/Package: 100/161 means 161 kernel per packet but only count 100 kernels.

Remainder: dump out kernel number after batch count.

Comment: what time the batch finished

3.3 Select, edit crop

Each crop has its own size, shape and weight and each of them associate with the counter speed, sensitivity, gate size and valve open/close delay time. When a crop was selected, the counter will automatically change the counter speed and Valve delay time, the Sensitivity and gate size have to be manually set.

Crop button was default labeled to Cron. Click this button, a crop parameter window will pop up as shown at Figure 3.3.1

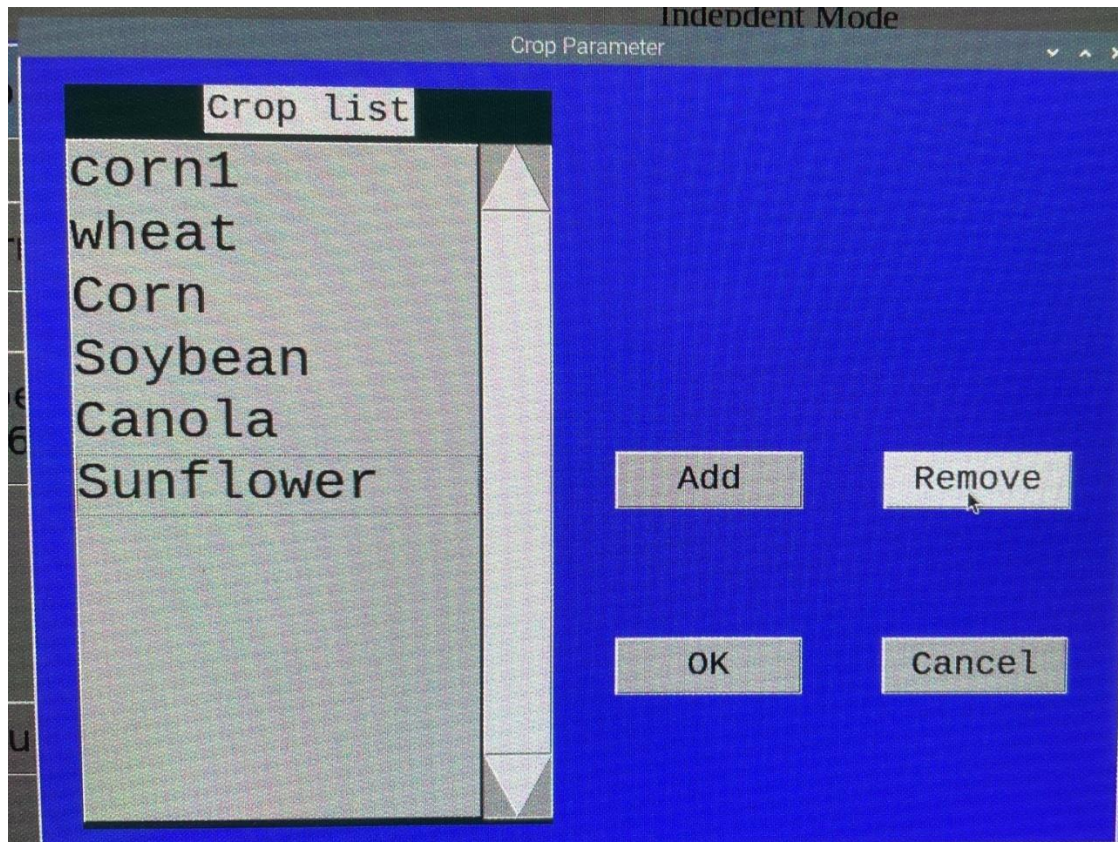


Figure 3.3.1

Select one crop in crop list then click ok, the label on the Crop button will change to crop selected

- Add crop
Click Add button, Crop parameter window will change to figure 3.3.2 as shown below

Noted that the crop name must unique. Input a name which is the same as Crop list, the software will refuse it.

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The screenshot shows a software window titled "Crop Parameter". It contains six input fields with labels on the left and range indicators on the right:

- 1.crop Name: [text input field]
- 2.Speed: [text input field] (1~200)
- 3.Sensitivity: [text input field] (1~10)
- 4.Valve delay time: [text input field] (50~250)
- 5.Feed HoriGate: [text input field] (1~20)
- 6.Feed VerGate: [text input field] (1~20)

Below the input fields is a numeric keypad with three rows of buttons:

q	w	e	r	t	y	u	i	o	7	8	9	<--
p	a	s	d	f	g	h	j	k	4	5	6	Ok
l	z	x	c	v	b	n	m	0	1	2	3	Exit

Figure 3.3.2

- Remove crop from list
Select crop in the crop list, click Remove button.

3.3 Change speed

Click Speed button, input the desired speed. 0 is Turntable at standstill. 200 is maximum speed.

The count speed is controlled by the Feed Turntable speed and size of gates in the Feed unit. When the size of gates is appropriately set, the count speed is only controlled by Turntable speed. Before starting to count, the operator needs to set Turntable speed in advance. The counter will take this speed as counting speed.

Attention: the setting of the Horizontal Gate, Vertical Gate and Sensitivity at this frame is only for reference purpose. The program itself does not set these parameters for counter and Operator has to set them in the counter manually. The setting value can be different from these numbers according to operator experience and desire.

Noted that, the count speed will be automatically changed as the kernel number of sample is close to the preset number of seeds per-packet during batch count. In most case we don't recommend to adjust count speed during batch count since the count time for one packet is too short to manipulate speed, and furthermore it may affect count accuracy

3.4 Save data, data file.

Plug a USB memory stick in the USB socket at front in control panel, control panel will detect this USB stick and pop up a dialogue window as shown at Figure 3.4.1

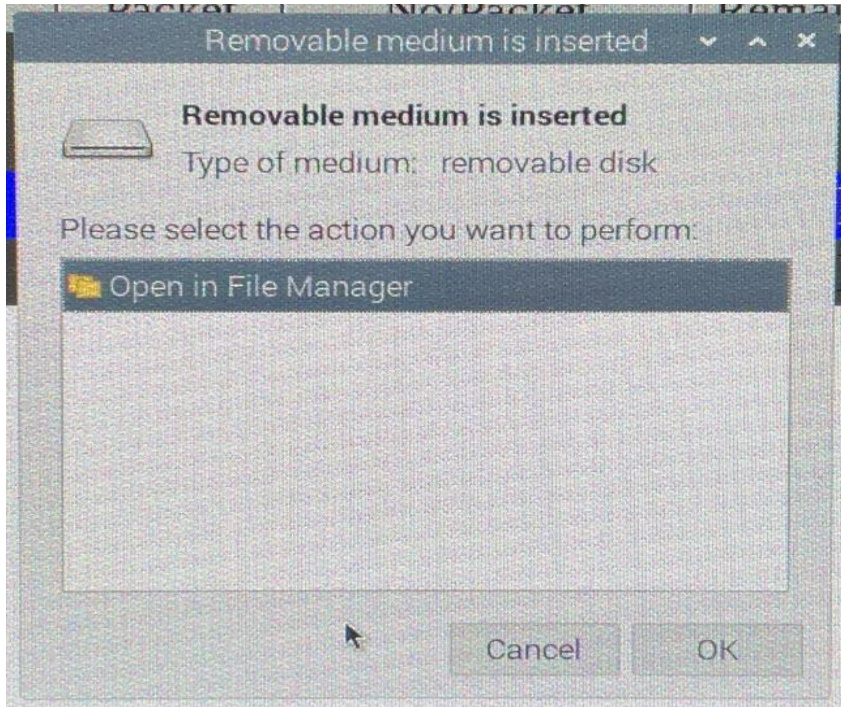


Figure 3.4.1

Select Cancel button then click Clear button or Home button. A dialogue window will pop up as shown at figure 3.4.2

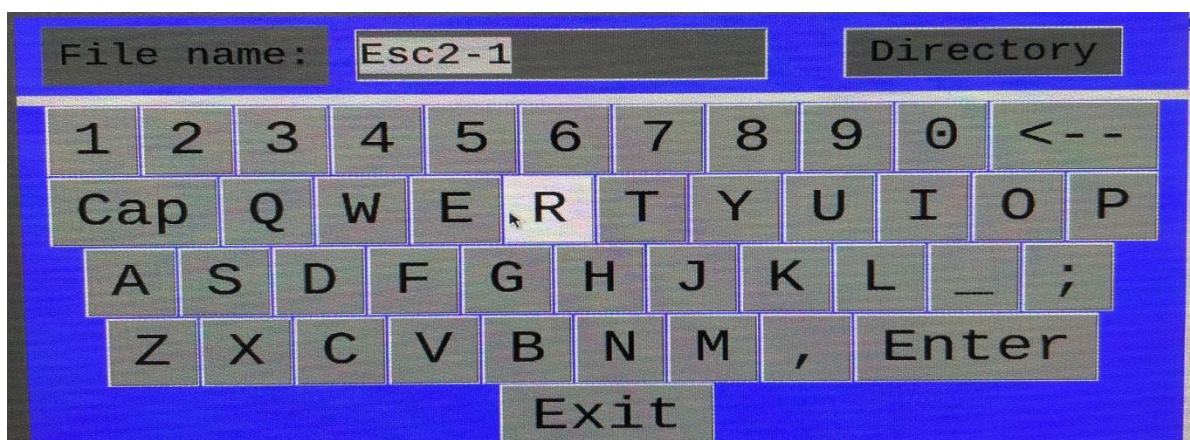


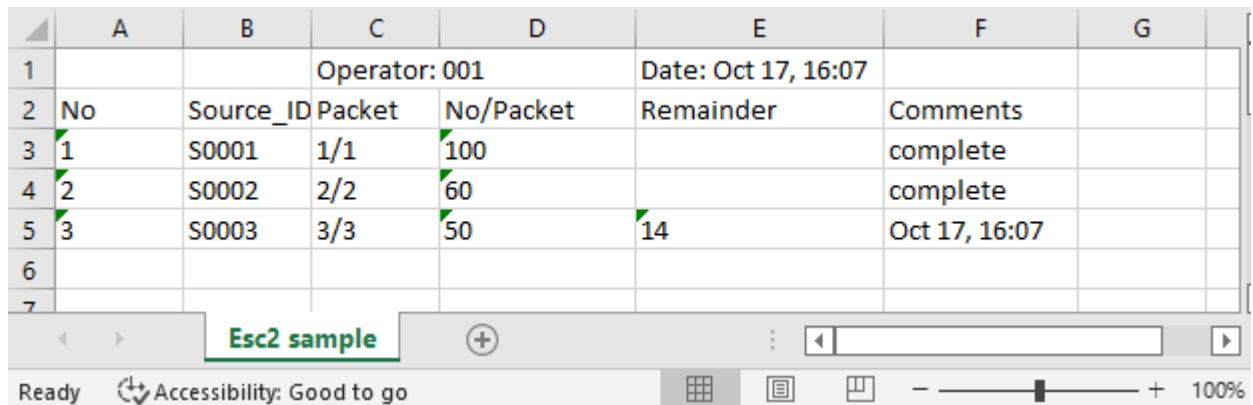
Figure 3.4.2

Input file name and click Enter

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Then you can use Microsoft excel file to open and edit.



	A	B	C	D	E	F	G
1			Operator: 001		Date: Oct 17, 16:07		
2	No	Source_ID	Packet	No/Packet	Remainder	Comments	
3	1	S0001	1/1	100		complete	
4	2	S0002	2/2	60		complete	
5	3	S0003	3/3	50	14	Oct 17, 16:07	
6							
7							

Ready Accessibility: Good to go

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4. Load File...

To use this function, a **barcode scanner** and a **USB memory stick** are required and the USB memory stick should have a prearranged excel file. Barcode scanner is used to scan barcode instead of hand entry.

How to prepare a prearranged excel file, see page 31

Select Load File..., Packet ID required window will pop up as shown at Figure 4.0

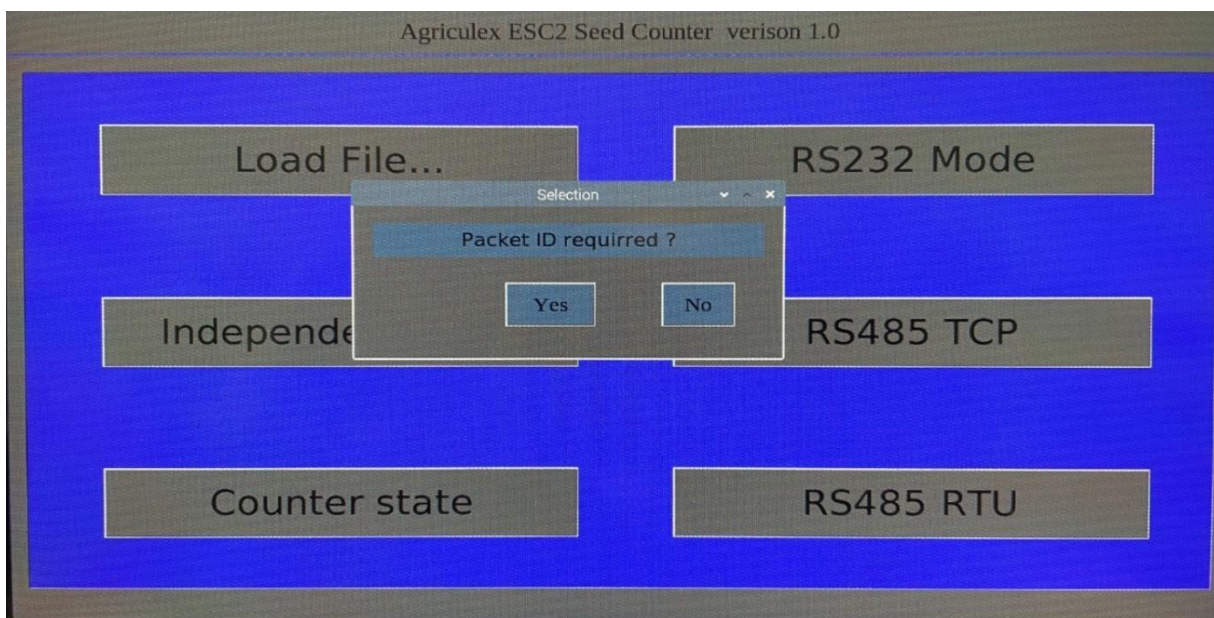


Figure 4.0

After clicking Yes or No button, the Figure 4.0.1 will pop up as shown at below

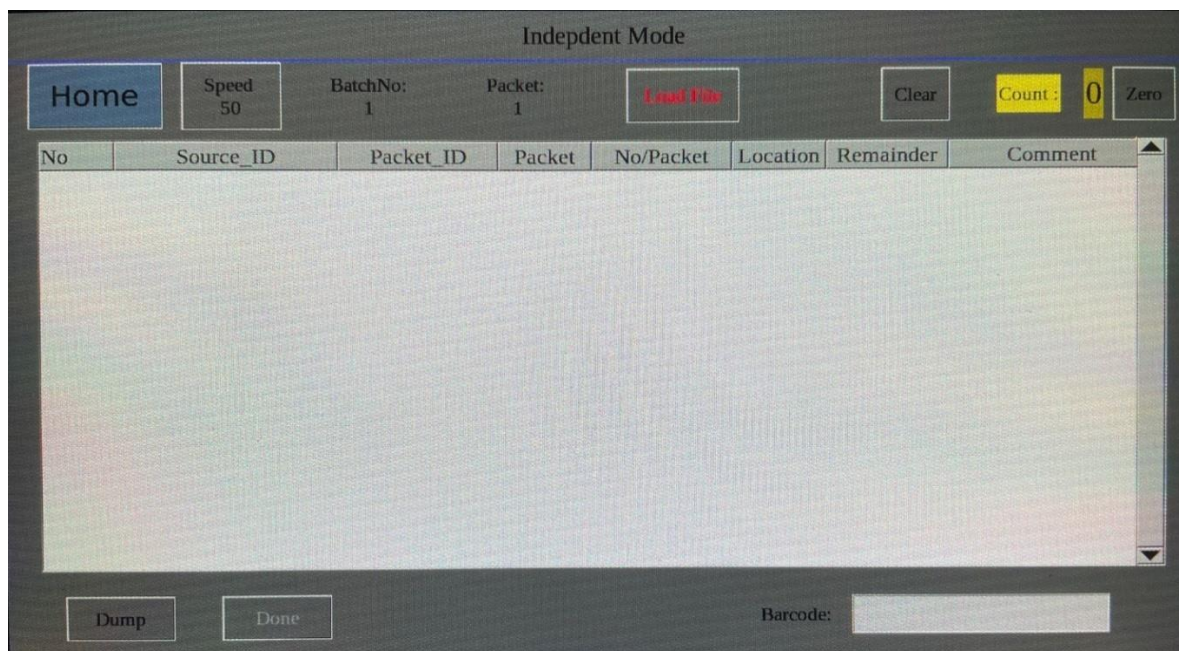


Figure 4.0.1

4.1 Packet ID not required.

If you click No button, the counter will only look at Source_ID. The Packet_ID will be ignored.

Insert a USB memory stick to a USB socket at front of the counter control panel, A window of USB memory stick insertion will pop up as shown at figure 4.1.1

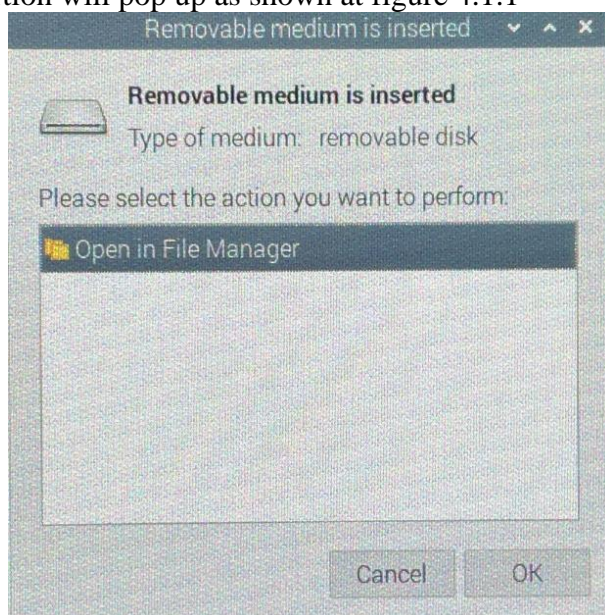


Figure 4.1.1

Click Cancel button then click Load File. Software will open this USB memory stick as shown at Figure 4.1.2. In here, the USB memory stick is Lexar brand and was referred as a directory. Click this directory, choose a prearranged excel file to open.

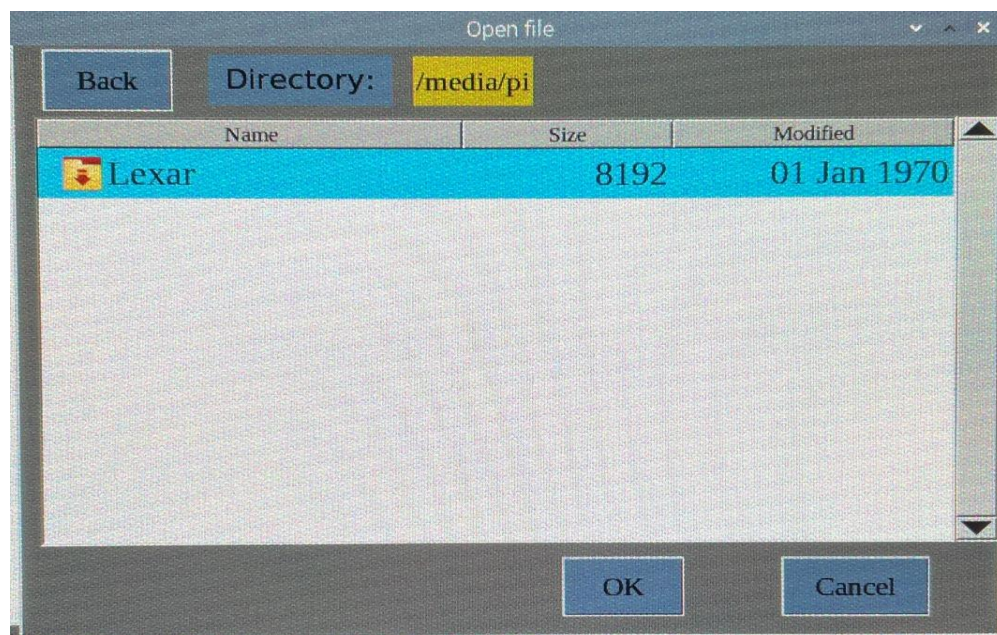


Figure 4.1.2

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After a prearranged excel file opened, the area of Barcode entry is activated and the window becomes to figure 4.1.3 as shown at below.

No	Source_ID	Packet_ID	Packet	No/Packet	Location	Remainder	Comment
1	JR52GATMW0AQZ	SSL07171613	1	100	0	0	60
2	JR52GATMW0AQZ	SSL07175862	1	50	0	0	0
3	JR52GATMW0AQZ	SSL07172845	1	90	slates	0	0
4	JR52GATMW0AQZ	SSL07171007	1	40	slates	265	40
5	JY2EG135PU01	SSL07172853	1	60	0	0	0
6	JY2EG135PU01	SSL07171619	1	90	guelph	0	0
7	JY2EG135PU01	SSL07175866	1	90	guelph	0	0
8	JY2EG135PU01	SSL07171000	1	80	slates	0	0
9	JY2EG135PU01	SSL07172853	1	60	0	160	0
10	JY2EG135PU01	SSL07172853	1	60	0	0	0
11	JY2EG135PU01	SSL07171619	1	90	guelph	0	0

Figure 4.1.3

- **Home** button: Click this button, the counter will exit Load File... and back to Main Frame
- **Speed** button: Click this button to set the speed
- **Clear** button: Click this button will clear input file in the item list and allow to load a new file.
- **Zero** button: Clear count number
- **Dump** button: Click this button, dump seeds from the hopper
- **Done** button: This button is inactive when no item is selected to count.
Click Done button, the counter will terminate the current count.
- Barcode entry area: use barcode scanner to scan a barcode which presenting a Source_ID or double click this area to bring out a keyboard to entry a Source_ID

Noted that the number in Comments column will be ignored.

Before entry Source_ID, click Speed button to set speed. After that, use a scanner to scan a barcode which presents a Sourced_ID or double click entry area to bring out a keyboard for manual input Source_ID. The software will color items selected as shown at Figure 4.1.4 and the counter start to count.

During counting, the Clear button and Barcode input area are inactive.

Look at the below figure 4.1.4. the item finished count has a different color and 'complete' will be placed in comment column. The area of barcode entry becomes active and waiting for another entry.

When finishing all items in the list, the counter will automatically dump extra seed from hopper and **Load File** button appear again and a new **Save** button appears at the left bottom in

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the window.

Indepdent Mode

Home Speed 50 BatchNo: 15 Packet: 1 Clear Count: 0 Zero

No	Source_ID	Packet_ID	Packet	No/Package	Location	Remainder	Comment
1	JR52GATMW0AQZ	SSL07171613	1	100	0	0	60
2	JR52GATMW0AQZ	SSL07175862	1	50	0	0	0
3	JR52GATMW0AQZ	SSL07172845	1	90	slates	0	0
4	JR52GATMW0AQZ	SSL07171007	1	40	slates	265	40
5	JY2EG135PU01	SSL07172853	1/1	60	0	0	complete
6	JY2EG135PU01	SSL07171619	1/1	90	guelph	0	complete
7	JY2EG135PU01	SSL07175866	1/1	90	guelph	0	complete
8	JY2EG135PU01	SSL07171000	1/1	80	slates	0	complete
9	JY2EG135PU01	SSL07172853	1/1	60	0	160	complete
10	JY2EG135PU01	SSL07172853	1/1	60	0	0	complete
11	JY2EG135PU01	SSL07171619	1/1	90	guelph	0	complete

Dump Done Barcode: JR52GATMW0AQZ

Figure 4.1.4

Click Save button, the file will store to USB memory stick

4.2 Packet ID required

If you click **Yes** button at above figure 4.0, the counter will look at Packet_ID and Source_ID when it conducts count. This is very useful option if you want to count a specific item in the list and ensure each Packet_ID match Source_ID

Under this count mode, you can preset a count speed at Comment column in the list, the count will use this speed to count. The detailed information to see page

After click Yes button, then click **Load File** to load a prearranged excel file. Use a scanner to scan a barcode including Packet_ID, delimiter and Source_ID. The below two barcodes are an example and the contents of the barcode is SSL07171619;JY2EG135PU01

- Barcode Format: code 128,
- Data to Encode: SSL07171619;JY2EG135PU01
- X-Dimension:1



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- Barcode Format: DataMatrix
- Data to Encode: SSL07171619;JY2EG135PU01
- X-dimension:2



The content of barcode:SSL07171619;JY2EG135PU01

Where:

- SSL07171619 is Packet_ID
- ; is delimited
- JY2EG135PU01 is Source_ID

Noted that, no space between above the content

If the scanner is unavailable, double click the area of barcode entry to bring out a keyboard. After entry, the software will color all items with the same Source_ID and deepen blue color for the item selected as shown at figure 4.2.1. If a specific speed not placed in Comment column, the count will use default set to conduct count. After finishing count, the valve in the counter will close valve and prevent the extra seed falls in this batch. After sample seed are discharged out, the valve will open and the extra seed come into next count. At this moment, if you can click Zero button and discharge out these extra seeds, the coming count will not exclude this extra seed.

Independent Mode

Home Speed: 33 BatchNo: 1 Packet: 1 Clear Count: 13 Zero

No	Source_ID	Packet_ID	Packet	No/Package	Location	Remainder	Comment
1	JR52GATMW0AQZ	SSL07171613	1	100	0	0	60
2	JR52GATMW0AQZ	SSL07175862	1	50	0	0	0
3	JR52GATMW0AQZ	SSL07172845	1	90	slates	0	0
4	JR52GATMW0AQZ	SSL07171007	1	40	slates	265	40
5	JY2EG135PU01	SSL07172853	1	60	0	0	0
6	JY2EG135PU01	SSL07171619	1/1	90	guelph	0	complete
7	JY2EG135PU01	SSL07175866	1	90	guelph	0	0
8	JY2EG135PU01	SSL07171000	1	80	slates	0	0
9	JY2EG135PU01	SSL07172853	1	60	0	160	0
10	JY2EG135PU01	SSL07172853	1	60	0	0	0
11	JY2EG135PU01	SSL07171619	1	90	guelph	0	0

Dump Done Barcode:

Figure 4.2.1

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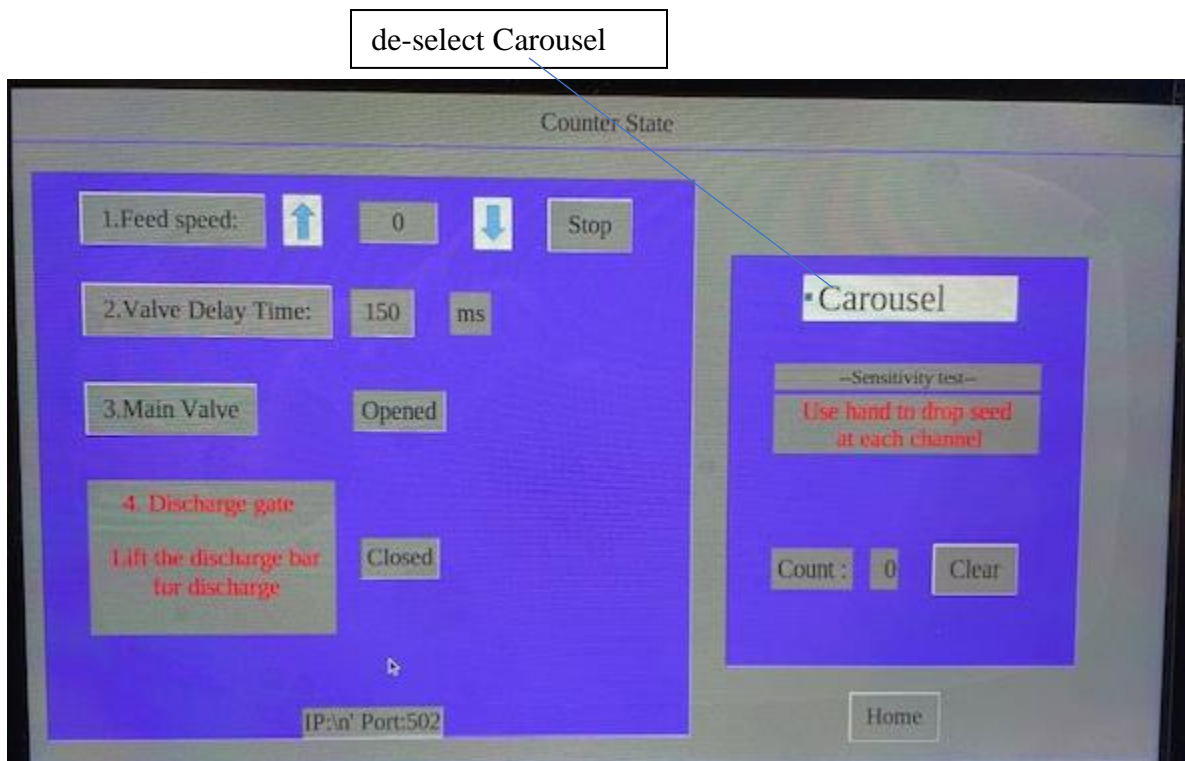
After finishing all Source_ID items with colored, the counter will automatically dump seed from the hopper.

5 RS232 Mode

5.1 Connect counter to computer

Use a RS232 communication cable to connect the seed counter to your computer. If your computer doesn't have a RS232 port, you need a USB to RS232 converter to connect the seed counter to your computer.

After connecting, turn on power of the ESC-2 Seed Counter and wait for the main menu to appear on the display panel. Select Counter State, then de-select Carousel



Back to Main screen by click Home.

Select RS232 Mode and the counter becomes a slave and the computer becomes a master. The master sends commands to the slave and receive data from slave. the slave counter will take action according the messages received.

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The following figure 5.1.1 shows a state of the counter waiting

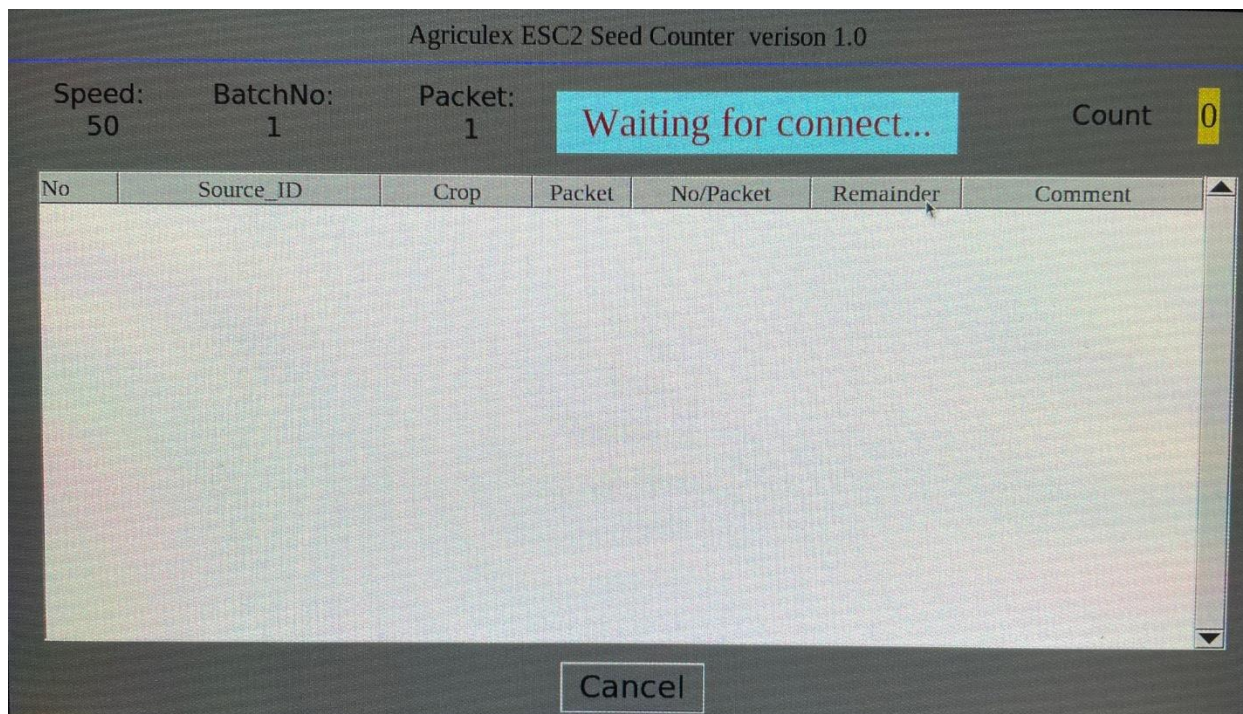


Figure 5.1.1

Double click ESC2_xv35 file to launch the program if the program has not been launched on your computer. The software will look like the figure 5.1.2 as shown below.

Explanation:

- **Connect:** send a Connect command to the counter. If sending success, connection with the counter will be established.
- **Disconnect:** send a Disconnect command to the counter. If sending success, the program will disconnect with the counter.
- **Start:** send Start command to the count. If sending success, the counter will start to count.
- **Stop:** send stop command to the counter, if sending success, the counter will pause counting.
- **Dump:** send Dump command to the counter. If sending success, the counter will clean out seeds remaining in the hopper.
- **Zero:** send clean kernel number command to the counter. If sending success, the kernel number will be clean to zero.
- **Reset:** send Reset command to the counter. If sending success, the counter will stop the current counting and back to waiting status.
- **Done:** send Done command to the counter, if sending success, the counter will recorder all information demand by software.
- **Load File...:** Open prearranged excel file.

Figure 5.1.2

Above figure just is an overall view, the more detail function of each button, menu and the control items will be further explained in following paragraphs.

- **Select Communication Port**

Click 'down arrow' from the Connect Set frame to select a COM port, see figure 5.1.3 as shown below. The **'Baud'** rate option is always inactive. Do not change the feed speed until the button of Connect to ESC2 has been clicked.

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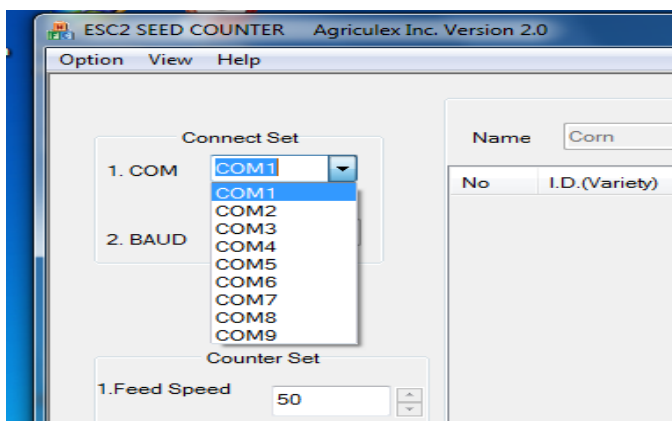


Figure 5.1.3

If you are not sure which COM port in the computer has been connected to the counter, follow below steps to find out.

Click Start (at left bottom corn of screen) → Control Panel, → System → Device manager → Port (COM&LPT)

In here, you will find which port is available or which port you are using.

- Connect to Counter

Click the Connect button. You will hear two sounds of the main valve closing and opening from the counter. If you heard the sounds, it means that the connection has been established. Otherwise, you should check COM port number and check whether the counter is at the state of waiting

After connecting, the counter becomes to waiting for data.

Do not click on the 'Load File...' button at this moment. We will talk about it later (see page 14, Import prearranged excel file.)

5.2 Prepare to count

Click the down arrow from the 'Seed List' in the 'Count Mode' frame to select seed name. See figure 5.2.1. When a selected seed name appeared on the top of name list, the parameters in the Count Set associating with this seed name will be automatically changed. The further information such as how to add 'seed name' and change associated parameters, see page 13(3.8 add seed parameters) or go to the **HELP** menu.

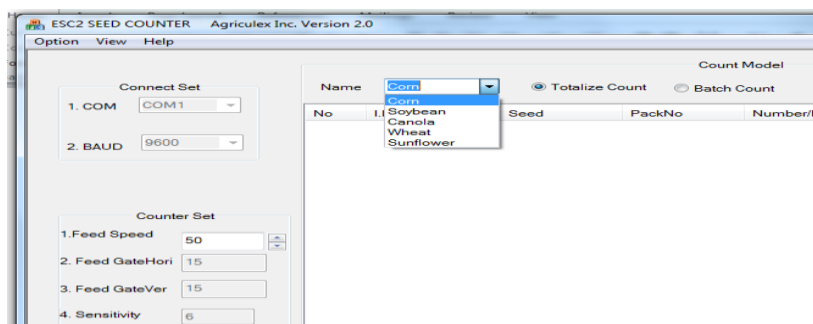


Figure 5.2

5.3 Totalize count

Before clicking on the 'Start' button you should select the count mode: Totalize count or Batch count. The default setting of count mode is Totalize.

- If count mode is not Totalize mode, select totalize mode.
- Enter ID at textbox of ID variety as shown on figure 5.3.1

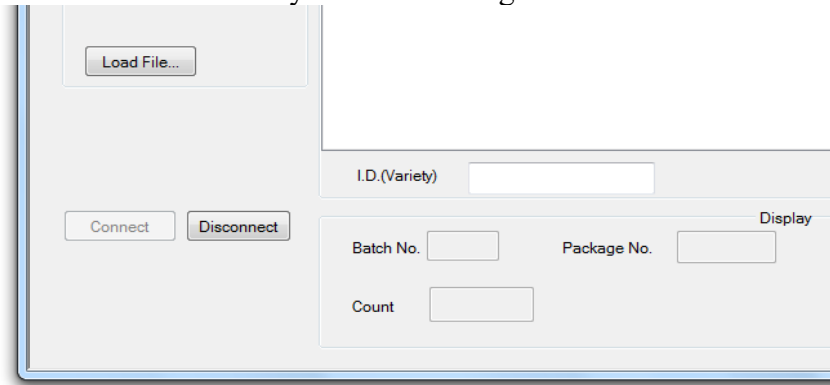
The screenshot shows a software interface with a 'Load File...' button at the top left. Below it are 'Connect' and 'Disconnect' buttons. To the right, there is a section for 'I.D.(Variety)' with a text input field. Below this are 'Batch No.' and 'Package No.' input fields, and a 'Count' input field. A 'Display' button is located to the right of the 'Package No.' field.

Figure 5.3.1

- If using keyboard to enter ID, 'Enter' key need be pressed after all ID have been entered
- If ID is entered by barcode scanner and your scanner not program with Enter key, you need press Enter key.

After ID is entered, the program will automatically start to count. If you want to enter information of location and comments before the counter start to count, you need go to menu Option→Set Counter to setup. After that, a dialog frame with count information will pop up on the screen as shown at figure 5.3.2. In the Totalize mode only 5 and 6 items are allowed to enter information. After entering information, Click the '**Done**' button or press 'Enter' key, the counter will automatically start to count.

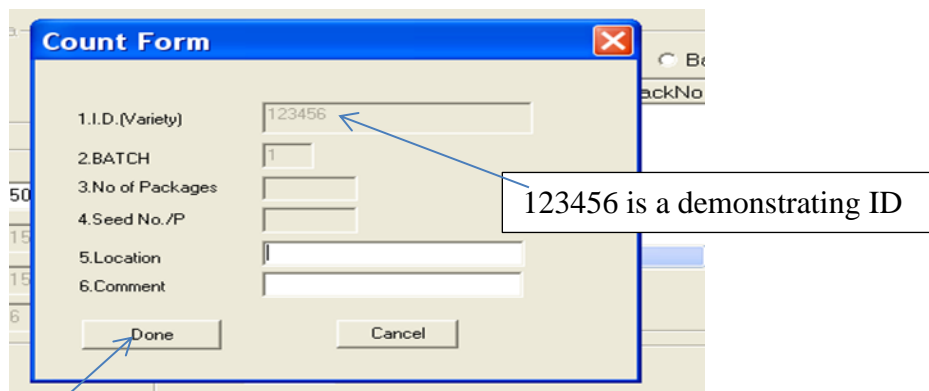
The screenshot shows a 'Count Form' dialog box with a blue title bar and a red close button. It contains six numbered input fields: '1.I.D.(Variety)' with the value '123456', '2.BATCH' with '1', '3.No of Packages', '4.Seed No./P', '5.Location', and '6.Comment'. At the bottom are 'Done' and 'Cancel' buttons. A blue arrow points from the 'Done' button to the text '123456 is a demonstrating ID' in a separate box. Another blue arrow points from the '123456' text in the first field to the same text in the separate box.

Figure 5.3.2

During the count period, you can click 'Stop' or 'Start' button on the computer or press correspond button represents 'Stop' or Start at control unit of the counter. After finishing totalize the count, click the '**Done**' button as shown on figure 5.3.3 or lift Envelope slide bar in the counter in order the program can record the count number.

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I.D.(Variety)

Batch

Count Packages

Figure 5.3.3

5.4 Batch Count

Multiple batch count is available if you choose batch count mode.

Example 1:

2 batches

First batch: 2 packets 100 seeds per packet

Second batch: 5 packets 50 seeds per packet

Select '*Batch Count Mode*'. If the cursor is not appeared at ID (Variety) textbox, move mouse over there and click.

Enter an ID following an Enter key or scan a barcode. A dialog frame will pop up as shown figure 5.4.1. If you do not setup Set Counter, the items of Location and Comments will not appear on the Frame.

ESC2 SEED COUNTER Agriculex Inc. Version 2.0

Option View Help

Count Model

Name: corn ☐ Totalize Count ☒ Batch Count

No	I.D.(Variety)	Seed	PackNo	Number/P	Location	Comment	Inventory
----	---------------	------	--------	----------	----------	---------	-----------

Data Input

1. I.D.(Variety)

2. Batch

3. No. of Packet

4. Seed NO/P

5. Location

6. Comments

I.D.(Variety)

Batch No. Package No.

Count

Figure 5.4.1

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Note that Item 2, Batch number, is 1. It means that this is the first batch.

- Enter number 2 in item 3: No of Packets.
- Enter number 100 in item 4: Seed No/P.

Press the **'Enter'** key (*DO NOT click the Done Button*). Note that if you click Done button, the program will exit the Data Input dialog frame. If Done button has not been clicked, item 2, Batch number, has changed to 2. It means this is a second batch.

- Enter number 5 in item 3: No of Packets.
- Enter number 50 in item 4: Seed No/P.

Click on the **'Done'** button. Then click on the **'Start'** button. The counter will start counting.

Example 2:

1 batch
2 packets 100 seeds per packet

- Enter number 2 in item 3: No of Packets
- Enter number 100 in item 4: Seed No./P

NB: In the *'Batch Count Mode'* you can click on the *'Done'* button to end the Batch Count at any time when there are not enough seeds in the hopper or should you wish to quit counting.

5.5 Set the dialog of sample Ready, dump

You can select the setting of the *'auto-dump'* seed or *'manual dump'* seed as batch count has been completed. The default setting is auto-dump. Under this mode the residual seed in the hopper will be dumped out as the counter finishes the batch count. In the manual dumping mode, you will have a chance to repeat the previous batch count before you click the **'Dump'** button to dump out the residual seed in the hopper.

You have also the option to set-up the *'sample ready dialog'* appearance should you wish to do so. The default setting is a dialog frame will pop up as the sample is ready for loading.

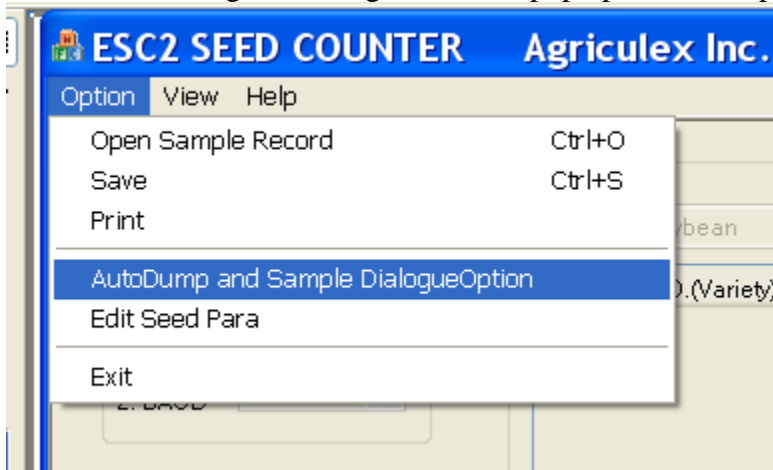


Figure 5.5.1

5.6 Add seed parameters

You can add the seed name and associated parameters into this program for future use. Click Option menu to select '*Edit Seed Para*'. See above Figure 5.5.1

Click *Edit Seed Para*, Edit Seed Dialog will pop up as figure 5.5.2 shown below

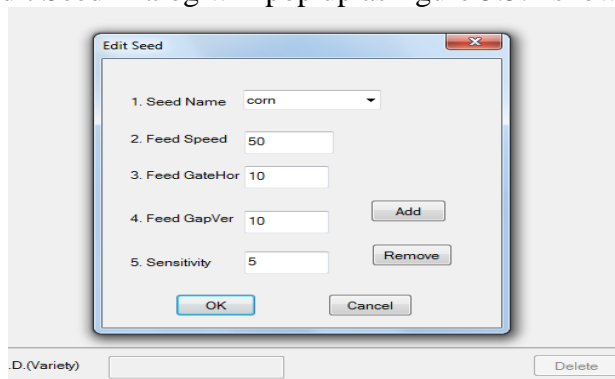


Figure 5.5.2

Click the '**Add**' button to add seed name and associated parameters.

- *Set Feeding Speed of the turntable*

You can set-up feeding speed of the turntable after the connection between PC and the counter has been established. This speed is referred to as '*Feed Speed*'. You can change the Feed Speed at any time during counting.

For batch counting, all seed samples will run at the Feed Speed until you specify a seed sample run at a specified speed. If you have placed a numeric value in the 'Comment column' cell, the sample in correspond row will run at this specified speed. For more information, see page 18 (4.5 Comment column),

5.7 Import prearranged excel file

Before loading a '*Prearranged Excel File*', you will need to prepare a file for loading. The detailed information for prearrange excel file see chapter 7: '*File Format*'.

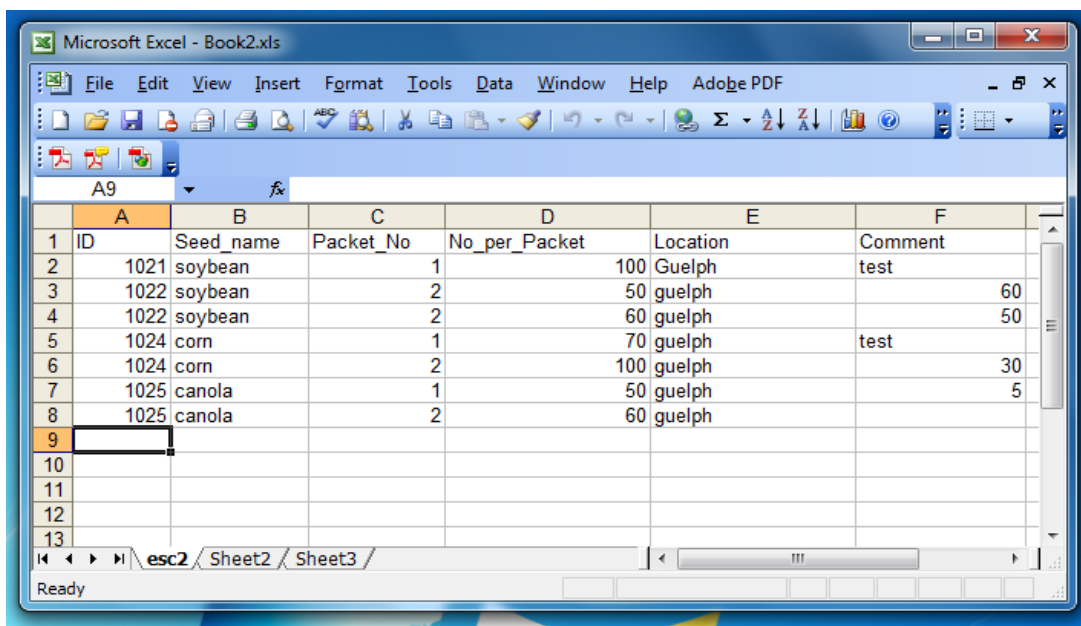
A simple prearranged excel file looks like the figure5.7.1 shown below:

NB: The format of the main title is important. ID must appear in the first cell in the main title.

NB: the Tag of Sheet must be esc2.

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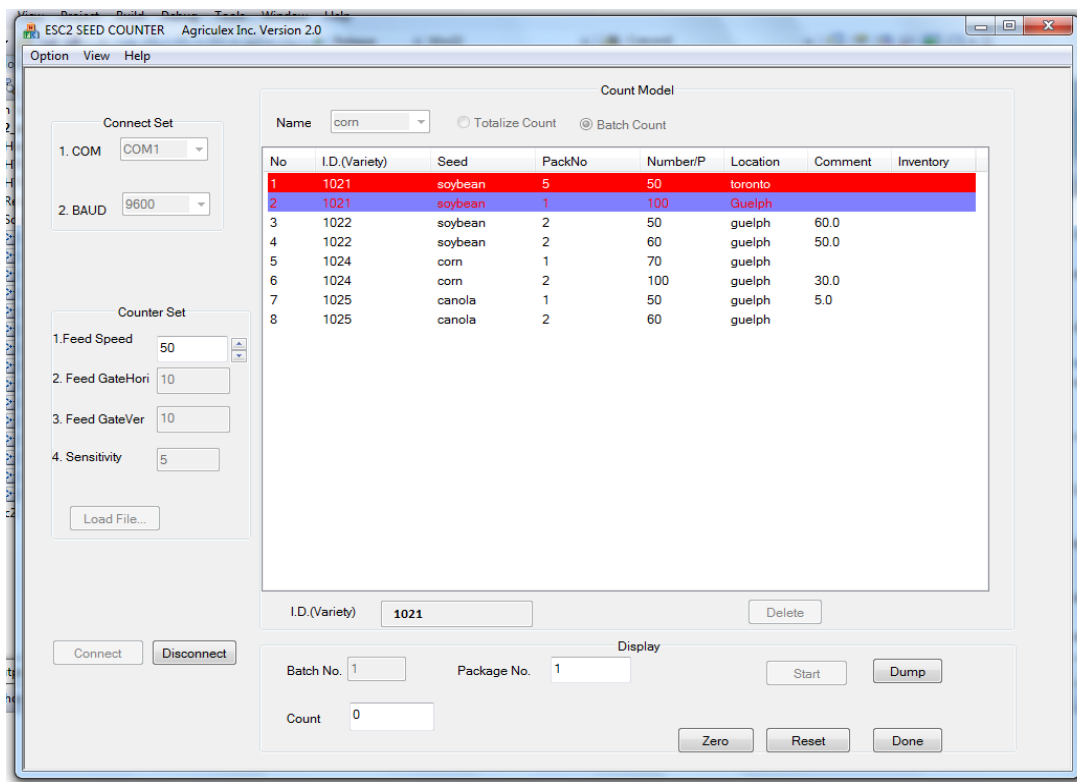
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	A	B	C	D	E	F
1	ID	Seed_name	Packet_No	No_per_Packet	Location	Comment
2	1021	soybean	1	100	Guelph	test
3	1022	soybean	2	50	guelph	60
4	1022	soybean	2	60	guelph	50
5	1024	corn	1	70	guelph	test
6	1024	corn	2	100	guelph	30
7	1025	canola	1	50	guelph	5
8	1025	canola	2	60	guelph	
9						
10						
11						
12						
13						

Figure 5.7.1

Click on the 'Load File...' button in the 'Count Para frame', an open file dialog frame will pop up, select a prearranged excel file, then click ok. After that, the contents of the file will display on the list table in the Count Model frame as figure 5.7.2 shown below:



ESC2 SEED COUNTER Agriculex Inc. Version 2.0

Option View Help

Connect Set

1. COM COM1

2. BAUD 9600

Counter Set

1. Feed Speed 50

2. Feed GateHori 10

3. Feed GateVer 10

4. Sensitivity 5

Load File...

Count Model

Name corn Totalize Count Batch Count

No	I.D.(Variety)	Seed	PackNo	Number/P	Location	Comment	Inventory
1	1021	soybean	5	50	toronto		
2	1021	soybean	1	100	Guelph		
3	1022	soybean	2	50	guelph	60.0	
4	1022	soybean	2	60	guelph	50.0	
5	1024	corn	1	70	guelph		
6	1024	corn	2	100	guelph	30.0	
7	1025	canola	1	50	guelph	5.0	
8	1025	canola	2	60	guelph		

I.D.(Variety) 1021 Delete

Batch No. 1 Package No. 1 Start Dump

Count 0 Zero Reset Done

Figure 5.7.2

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Enter an ID number or scan a Barcode into the textbox named as I.D. (Variety), the matched ID in the item list will be selected and colored. See above figure 5.7.2.

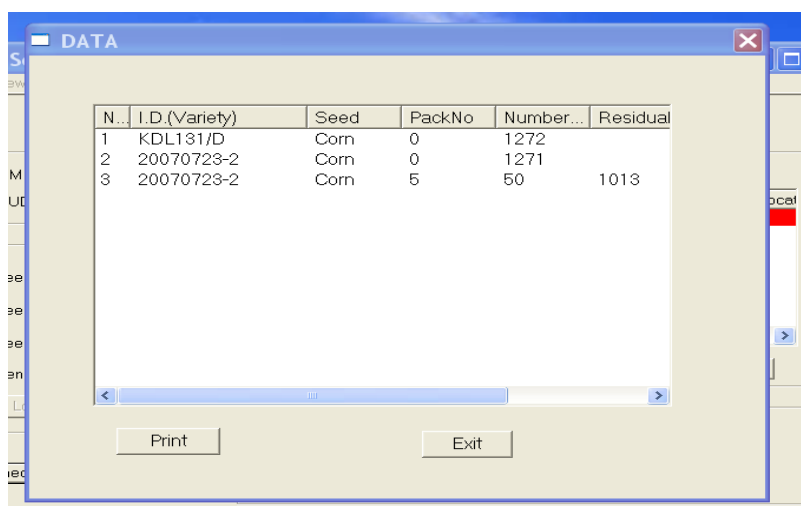
The red color represents the counter is counting this item. The black color represents this item has been counted (not appeared here). The purple color represents the item is waiting for count.

5.8 Open, save & print data files

In the Remote mode, you can open, save, and print counting information.

- Click Option menu—>Select Open sample record.

See figure 5.8.1 shown below for example of results:



N.	I.D.(Variety)	Seed	PackNo	Number...	Residual
1	KDL131/D	Corn	0	1272	
2	20070723-2	Corn	0	1271	
3	20070723-2	Corn	5	50	1013

Figure 5.8.1

Open file is only available to open a record file with “.txt” extension. After counting you can save the data. For more detail refer to the HELP menu.

5.8.1 Check Inventory number

- Click View in the menu.
- Choose I.D. (variety) and enter an ID number. Or to scan a barcode.

The inventory number will display on the dialogue frame.

5.8.2 Check the status of the counting

- Click view in the menu
- Choose edit

A dialog frame will be pop-up on the screen to display all of the information.

6. File Format

6.1 Limit and Constraint

Before starting to prepare an 'EXCEL' file, the 'Limit and Constraint' should be understood.

- First row is a header of counting data and every count file should include a header at first row.
- Maximum row in the file is 30000
- Each cell in first row is the tag of each column. The sequence of each tag is shown as following:
Sample_ID, Packet_ID, Packet No, Number/Packet, Location, Remarks and Comments.
The tag name of each column can be varied according your situation.
- If the file contains more than one sheet in the excel file, the software will open 'Sheet1'.
- For Totalize count, the value in the column of Packet No must be set to 0. The count number will be placed in the column of No/Packet and Remainder. The 'Total' will be placed in column of Comment.
- For each Batch count, the values in the column of Packet No and No/Packet must be greater than 0.
- Source ID in the column of Sourced_ID can be the same but Packet ID in the column of Packet_ID must be unique.

6.2 Standard Prearranged File

A standard prearranged file shown at the below figure 6.2.1.

	A	B	C	D	E	F	G
1	Source_D	Packet_ID	Packet	Num_Per_Pact	Location	Remainder	Comments
2	JR52GATMW0AQZ	SSL07171613	1	100			60
3	JR52GATMW0AQZ	SSL07175862	1	50			
4	JR52GATMW0AQZ	SSL07172845	5	90	slates		
5	JR52GATMW0AQZ	SSL07171007	1	40	slates		100
6	JY2EG135PU01	SSL07172853	1	60			
7	JY2EG135PU01	SSL07171619	10	90	guelph		
8	JY2EG135PU01	SSL07175866	1	90	guelph		
9	JY2EG135PU01	SSL07171000	1	80	slates		
10	S100	P100	0				
11							

Figure 6.2.1

Looks at the column of Comments at row 2 and row 5 at above Figure 6.2.1, the value in each cell is the counter speed. Under packet_ID required mode, the counter will take this value as the counter speed. Under packet_ID not required mode, this value will be ignored.

In cell C4 and C7, the value is packet number.

Looks at cell (c10), the 0 means it is a Totalize count.

6.3 Simplified prearranged file

The column Location, Remainder and Comments can be omitted in the header. The tag in each column in the header can be varies. The figure 6.2.2 is an example

Noted that the content in omitted column should be empty

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	A	B	C	D	E	F	G
1	Mat_lot_ID	Plot_ID_Barcode	Packet	Num_Per_Pact			
2	JR52GATMW0AQZ	SSL07171613	2	100			
3	JR52GATMW0AQZ	SSL07175862	1	50			
4	JR52GATMW0AQZ	SSL07171007	1	40			
5	JY2EG135PU01	SSL07172853	5	60			
6	JY2EG135PU04	SSL07171000	1	80			
7	JY2EG135PU01	SSL07172853	4	60			
8	JY2EG135PU01	SSL07172853	10	60			
9	JY2EG135PU01	SSL07171619	1	90			
10	JY2EG135PU01	SSL07172853	1	60			
11	JR52GATMW0AQZ1	TSL07171007	5	40			
12	JR52GATMW0AQZ	TSL07171613	1	100			
13	JR52GATMW0AQZ	TSL07172845	60	90			
14	JR52GATMW0AQZ	TSL07175862	1	50			
15	JY2EG135PU01	TSL07172853	1	60			
16	JR52GATMW0AQZ	SEL07171007	1	40			
17	JR52GATMW0AQZ2	SEL07175862	8	50			
18	JR52GATMW0AQZ	SEL07172845	1	90			
19	JY2EG135PU02	SEL07171613	1	100			
20							
21							

Figure 6.2.2

6.4 Prearranged file without header

if a prearrange file without a header, the item in first row will be skipped by the counter and the counter read item from second row.

6.5 Comments column

The Comments column in the prearranged file can be a comment's string, a speed value and empty. If this cell is a counter speed. under Packet ID required, the counter will take this value as the counter speed.

Each item finished its count, the time will be placed at this cell in Totalized counter.

7 RS485 TCP &RTU

7.1 RS 485 Modbus TCP/IP mode

If you have an ethernet cable cat6, connect it. The ethernet port is at the back side of control box. To get IP address, click Counter State on the main Frame and IP address and port are shown at the bottom.

If you want to use wireless to connect the counter, you need a keyboard and a mouse to setup wireless connection. When a keyboard and a mouse have been connected to the control box, press Esc key in the keyboard to exit program then use the mouse to click at the top left corn as shown at figure 7.1.1

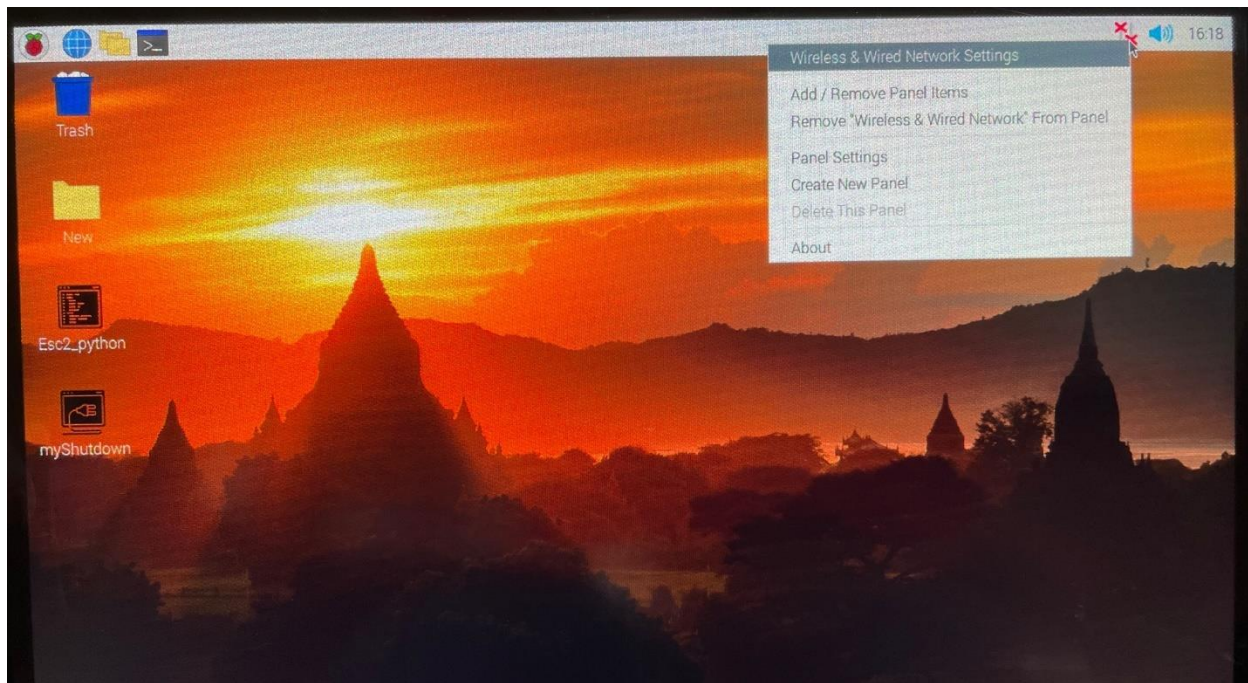


Figure 7.1.1

Click wireless & wired network setting to set wireless connection. After connection success, the red cross marks will disappear and a wireless connection mark will appear on the up right. Move the mouse cursor hover the mark of wireless connection, the IP address with port No will appear. Write down this IP address and port No and a third-party software need this information to connect the counter. Move the mouse cursor to the Esc2_python icon in the control panel and double click this icon, choose run in the terminal. After that, the program runs again. By the way, The IP address and port No can also find at Counter State.

Click RS485 TCP, the counter becomes a slave counter as shown at figure 7.1.2 and it waits for commands from a master.

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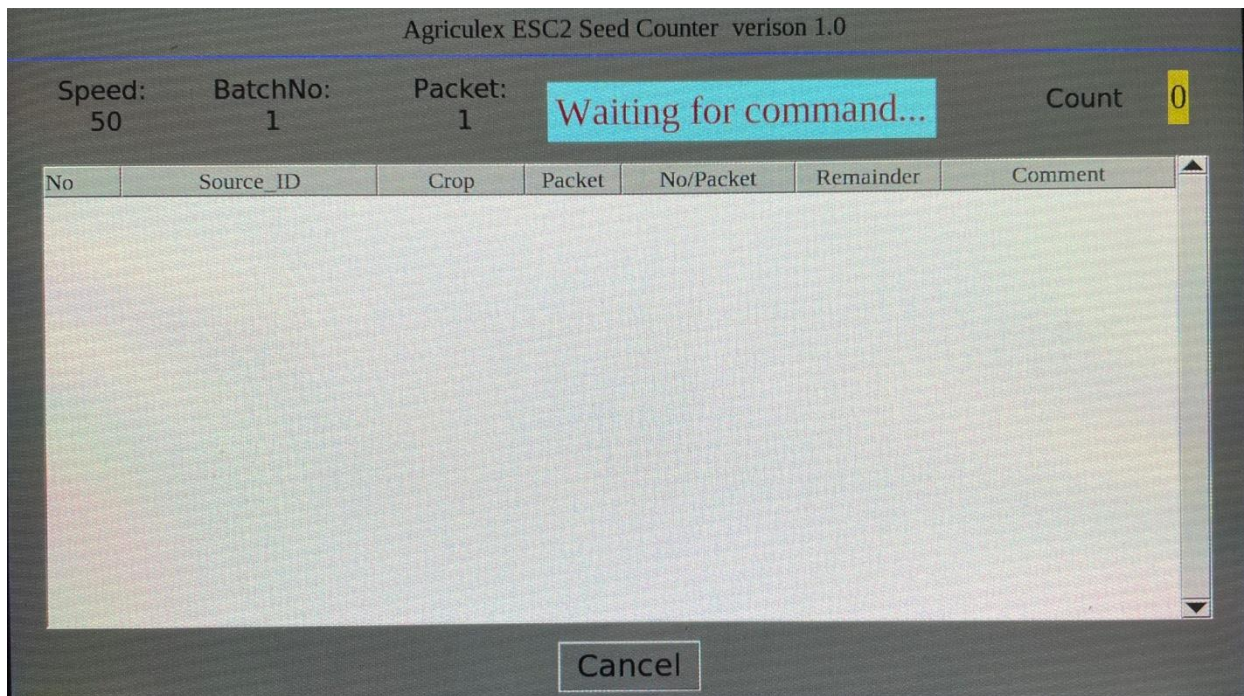


Figure 7.1.2

7.2 RS 485 Modbus RTU mode

If you choose this mode, you need a USB to rs485RTU converter and a 3 pins female terminal. The terminal manufacture product No is WJ15EDGK-3.81-3P. The below figure 7.2.1 shown pinout.

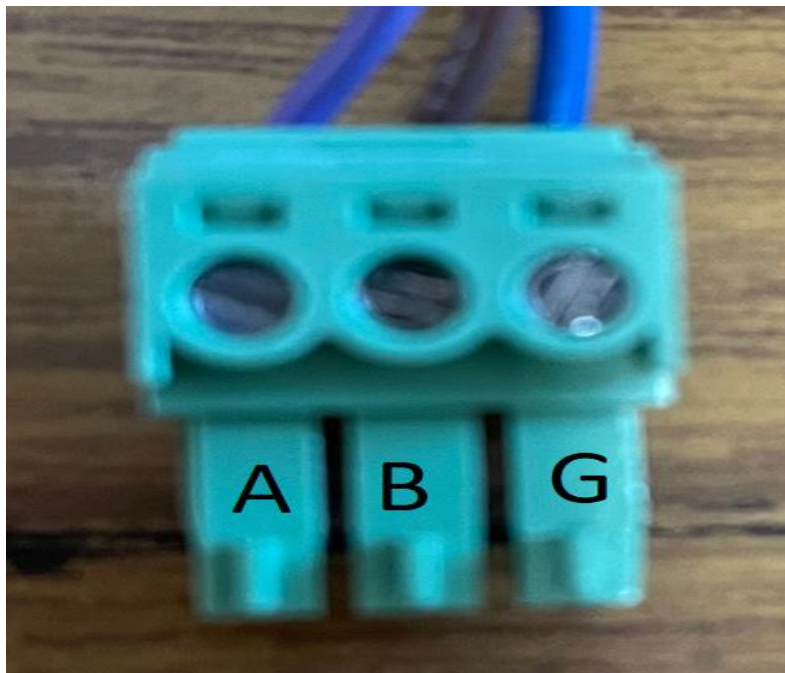


Figure 7.2.1

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Click RS485 RTU, the seed counter becomes a slave counter as shown above figure 7.1.2 and it waits for commands from a master.

8. Esc2 counter RS485 specification

This document is only for customer who will use ESC2 counter Modbus protocols and message for communication in programmable controller applications. It describes how message are constructed, and how transaction take place using Modbus protocol.

8.1 Parameters (RTU mode)

- Baud rate: 19200
- RTU mode. Esc2 seed counter does not support the ASCII mode
- Parity: None,
- 1 start bit
- Bytes:8, most significant bit sent first
- Stopbit:1
- Cyclical Redundancy check (CRC16 Modbus)

After CRC check, the low-order of the remainder of CRC is appended first, followed by the high-order byte

- In ESC2 counter, a silent interval of 50msec minimum is required in order to guarantee successful reception of the next request
- The entire message frame must be transmitted as a continuous stream. If a silent interval of more than 1.5-character times occurs before completion of the frame, the counter flushes the incomplete message and assumes that the next byte will be the address field of a new message

8.1.1 RS485 TCP mode

IP address is provided dynamically by Seed counter. Address can be found at Counter State in Control panel of Seed counter

Port: 502

8.1.2 Esc2 counter ID

ID=16

8.1.3 Error codes

If the counter receives a request, but the request cannot be processed, the counter will respond with an error code.

The response will contain the modified Function code, the high-order bit will be 1.

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- The Esc2 counter only support following error code

Error code	Modbus name	description	comments
01	Illegal function	The function code is not supported	
02	Data address is not available	Data address is not supported	
03	Illegal data	Data is not supported	
04	CRC check failed	The counter has problem	

- Error responds frame

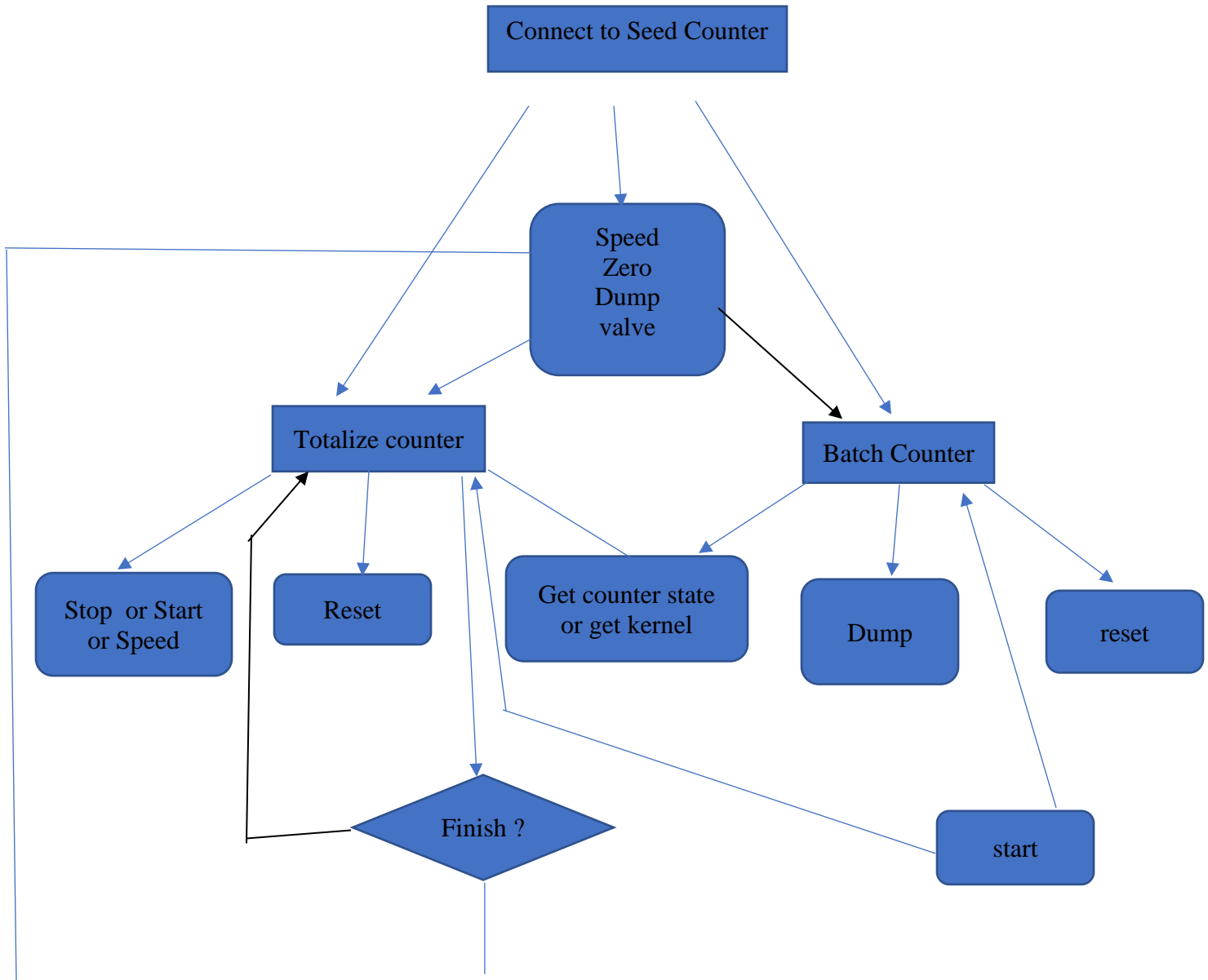
address	Function code with changed bit		Error code	Error check low	Error check high
---------	--------------------------------	--	------------	-----------------	------------------

8.1.4 Function codes

The Esc2 seed counter only support the following function codes which defined in Modbus

Code (Hex)	Modbus Name	description
04(04)	Read input registers	Read: 1.count number 2. count status
16(10)	Pre-set multiple registers	1. totalize counter. Address 100 2. batch count. Address 200 3. valve command Address 10 4. Speed command Address 12 5. Dump command Address 15 6. Start Address 20 7. Stop Address 25 8. Zero Address 30 9. Reset Address 35 10. Query kernel Address 50 11. Query state Address 60

8.1.5 Following chart shows how commands can be used



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8.2 RTU mode message framing

typical message frame is shown the below:

start	address	function	data	CRC CHECK	end
T1-T2-T3-T4	8 bits	8 bits	N x 8Bits	16 bits	T1-t2-t3-t4

8.2.1 Master send message to slave (the counter)

- Totalize count

Function code: 16(0x10)

Address: 100(0x64)—totalize

Speed: 50(0x32)

Query	Sample (Hex)	
counter address	0x10	
Function	0x10	preset multiple Registers
Starting Address Hi	0x00	
Starting Address Lo	0x64	totalize count
No. of registers Hi	0x00	
No. of Register Lo	0x01	1 register
Byte Count	0x02	
Data Hi	0x00	
Data Lo	0x32	speed 50

CRC 0xf1ef

Response	sample (Hex)	
counter address	0x10	
Function	0x10	preset multiple Registers
Starting Address Hi	0x00	
Starting Address Lo	0x64	totalize count
No. of registers Hi	00	
No. of Register Lo	0x01	1 register

CRC 0x5743

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- Batch count

Function code: 16(0x10)
Address: 200(0xc8) --batch count
First data: package number
Second data: number/ package
Third data: speed

Query	Sample (hex)	
Counter address	0x10	
Function code	0x10	preset multiple registers
Start address Hi	0x00	
Start address Lo	0xc8	batch count
No. of registers Hi	0x00	
No. of registers Lo	0x03	3 registers
Byte Count	6	6 bytes
Data Hi	00	
Data Li	0x0A	10 packages
Data Hi	0x12	
Data Lo	0x48	4680 kernels
Data Hi	00	
Data Lo	0x40	speed 64

CRC 0xd842

Response sample
(hex)

Counter address	0x10	
Function code	0x10	
Start address Hi	0x00	
Start address Lo	0xc8	batch count
No. of registers Hi	00	
No. of registers Lo	03	3 registers

CRC 0xb702

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- Close valve

Function code: 16(0x10)
Address: 10 (0x0a) Valve
Data: 1—close Valve, 2—open valve

Query	Sample (hex)	
Counter address	0x10	
Function code	0x10	preset Single Register
Start address Hi	0x00	
Start address Lo	0x0a	
No. of registers Hi	00	
No. of registers Lo	0x01	1 register
Byte count	0x02	
Preset Data Hi	00	
Preset Data Lo	0x01,	close valve
CRC	0x6aa7	

Response	Sample (hex)	
Counter address	0x10	
Function code	0x10	preset Single Register
Start address Hi	00	
Start address Lo	0x0a	
No. of registers Hi	00	
No. of registers Lo	0x01	1 register
CRC	0x8a22	

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- Open Valve

Function code: 16 (0x10)
Address: 10(0x0a), valve
Data: 2(0x02)—Open Valve

Query	Sample (hex)	
Counter address	0x10	
Function code	0x10	preset Single Register
Start address Hi	00	
Start address Lo	0x0a	
No. of registers Hi	00	
No. of registers Lo	0x01	1 register
Byte count	0x02	
Preset Data Hi	00	
Preset Data Lo	0x02,	close valve

CRC 0x6be7

Response	Sample (hex)	
Counter address	0x10	
Function code	0x10	preset Single Register
Start address Hi	00	
Start address Lo	0x0a	
No. of registers Hi	00	
No. of registers Lo	0x01	1 register

CRC 0xc8a22

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- Set speed

Function code: 16 (0x10)
Address: 12(0x0c) speed

Query	Sample (hex)	
Counter address	0x10	
Function code	0x10	preset Single Register
Start address Hi	00	
Start address Lo	0x0c	
No. of registers Hi	00	
No. of registers Lo	0x01	1 register
Byte count	0x02	
Preset Data Hi	00	
Preset Data Lo	0x32	Speed: 50
CRC	0x19e7	

Response	Sample (hex)	
Counter address	0x10	
Function code	0x10	preset Single Register
Start address Hi	00	
Start address Lo	0x0c	
No. of registers Hi	00	
No. of registers Lo	0x01	1 register
CRC	0x8bc2	

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- Dump

Function code:	16 (0x10)	
Address:	15(0x0f)	Dump
Speed: 200(0xc8)		
Query	Sample	
	(hex)	
Counter address	0x10	
Function code	0x10	function code
Start address Hi	00	
Start address Lo	0x0f	dump
No. of registers Hi	00	
No. of registers Lo	0x01	1 register
Byte count	0x02	
Preset Data Hi	0x00	
Preset Data Lo	0xc8	

CRC 0x6967

Response Sample
(hex)

Counter address	0x10	
Function code	0x10	function code
Start address Hi	00	
Start address Lo	0x0f	
No. of registers Hi	00	
No. of registers Lo	0x01	1 register

CRC 0xb832

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- Start

Function code: 16 (0x10)
Address: 20(0x14) Start

Query	Sample	
	(hex)	
Counter address	0x10	
Function code	0x10	preset Single Register
Start address Hi	00	
Start address Lo	0x14	
No. of registers Hi	00	
No. of registers Lo	0x01	1 register
Byte count	0x02	
Preset Data Hi	ff	
Preset Data Lo	ff	Speed: 0

CRC 0xa464

Response	Sample	
	(hex)	
Counter address	0x10	
Function code	0x10	preset Single Register
Start address Hi	00	
Start address Lo	0x14	
No. of registers Hi	00	
No. of registers Lo	0x01	1 register

CRC 0x8c42

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- Stop

Function code: 16 (0x10)
Address: 25(0x19) Stop

Query	Sample	
	(hex)	
Counter address	0x10	
Function code	0x10	preset Single Register
Start address Hi	00	
Start address Lo	0x19	
No. of registers Hi	00	
No. of registers Lo	0x01	1 register
Byte count	0x02	
Preset Data Hi	00	
Preset Data Lo	00	Speed: 0

CRC 0x0964

Response	Sample	
	(hex)	
Counter address	0x10	
Function code	0x10	preset Single Register
Start address Hi	00	
Start address Lo	0x19	
No. of registers Hi	00	
No. of registers Lo	0x01	1 register

CRC 0x4fd3

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- Zero

Function code: 16 (0x10)
Address: 30(0x14) Stop

Query	Sample	
	(hex)	
Counter address	0x10	
Function code	0x10	preset Single Register
Start address Hi	00	
Start address Lo	0x14	
No. of registers Hi	00	
No. of registers Lo	0x01	1 register
Byte count	0x02	
Preset Data Hi	ff	
Preset Data Lo	ff	

CRC 0x0e64

Response	Sample	
	(hex)	
Counter address	0x10	
Function code	0x10	preset Single Register
Start address Hi	00	
Start address Lo	0x14	
No. of registers Hi	00	
No. of registers Lo	0x01	1 register

CRC 0x8e62

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- Reset

Function code: 16 (0x10)
Address: 35(0x19) Stop

Query	Sample	
	(hex)	
Counter address	0x10	
Function code	0x10	preset Single Register
Start address Hi	00	
Start address Lo	0x19	
No. of registers Hi	00	
No. of registers Lo	0x01	1 register
Byte count	0x02	
Preset Data Hi	ff	
Preset Data Lo	ff	

CRC 0x0e64

Response	Sample	
	(hex)	
Counter address	0x10	
Function code	0x10	preset Single Register
Start address Hi	00	
Start address Lo	0x19	
No. of registers Hi	00	
No. of registers Lo	0x01	1 register

CRC 0x8e62

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- Get counter number

Function code:	4 (0x04)	
Address—50(0x32)		
Query	Sample	
	(hex)	
Counter address	0x10	
Function code	0x04	read input Register
Start address Hi	00	
Start address Lo	0x14	
No. of registers Hi	00	
No. of registers Lo	0x01	1 register

CRC	0x8f72
-----	--------

Response	Sample	
	(hex)	
Counter address	0x10	
Function code	0x04	read input Register
Byte count	04	4 bytes
Data Hi	00	
Data Lo	02	
Data Hi	10	
Data Lo	05	135,173 kernels

CRC	0x8696
-----	--------

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- Get counter status

Function code: 4 (0x04)
Address: 60(0x3c)

Query	Sample	
	(hex)	
Counter address	0x10	
Function code	0x04	read input Register
Start address Hi	00	
Start address Lo	0x1e	
No. of registers Hi	00	
No. of registers Lo	0x01	1 register

CRC 0x8d52

Response	Sample	
	(hex)	
Counter address	0x10	
Function code	0x04	read input Register
Byte count	02	1bytes
Data Hi	00	
Data Lo	00	00—waiting, 01--counting

CRC 0x3345

8.3 Counter Modbus TCP/IP mode

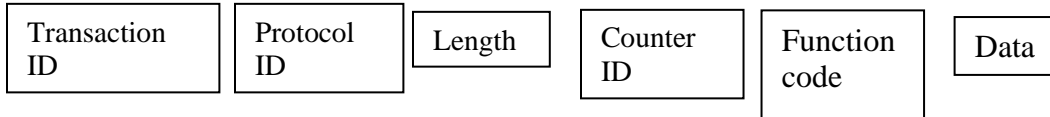
The protocol of Esc2 counter TCP/IP follows Modbus TCP protocol

The interface is an Ethernet network, the data transfer protocol is TCP/IP

The TCP port used is: 502

The IP address can be found at Counter State in the menu of the counter control box.

The message comprises of MBAP Head and PAU shown as the below:



The MBAP is comprised of Transaction ID, protocol ID, length of message and the ID of counter.

Protocol ID is 0, Counter ID is 0x10

The PDU is comprised of Function Code and Data

The protocol of Esc2 counter Modbus in TCP/IP mode only support function code 16(0x10),4(0x04)

8.3.1 request a Totalize count:

- Address: 100;
- Function code :16(0x10)
- Device ID: 16(0x10)
- turntable speed: 50

Data=[0x00,0x01,0x00,0x00,0x00,0x09,0x10,0x10,0x00,0x64,0x00,0x1,0x02,0x00,0x32]

Data [0]-[1]:	0x0001	Transaction ID
Data [2]-[3]:	0x0000	Protocol ID.
Data [4]-[5]:	0x0009	Message length
Data [6]:	0x10	the counter ID
Data [7]:	0x10	function code. Must be 0x10
Data [8]-[9]:	0x0064	address: 100 (0x64)
Data [10]-[11]:	0x0001	Number of registers
Data [12]:	0x02	bytes Number
Data [13]-[14]:	0x0032	speed: 50 (0x32)

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8.3.2 request a Batch count:

- Address:200
- Function code: 16(0x10)
- Device ID:16 (0x10)
- Package No:5
- Kernel Number/package:100
- Turntable Speed: 50

Data=[0x00,0x02,0x00,0x00,0x0f,0x10,0x10,0x00,0xc8,0x00,0x04,0x8,0x00,0x02,0x00,0x05,0x00,0x64,0x00,0x32]

Data [0]-[1]:	0x0002	Transaction ID
Data [2]-[3]:	0x0000	Protocol ID.
Data [4]-[5]:	0x000D	Message length,13 bytes
Data [6]:	0x10	the counter ID
Data [7]:	0x10	function code. Must be 0x10
Data [8]-[9]:	0x00c8	address: 200
Data [10]-[11]:	0x0003	Number of registers
Data [12]:	0x06	bytes number
Data [13]-[14]:	0x0005	package number: 5
Data [14]-[15]:	0x0064	kernel/package: 100
Data [[16]-[17]:	0x0032	speed: 50

8.3.3 request Close valve or open valve

- Address:10 (0x0a)
- Function code: 16 (0x10)
- Data: 1-close, 2-open

Data=[0x00,0x03,0x00,0x00,0x0b,0x10,0x10,0x00,0x0a,0x00,0x02,0x4,0x00,0x03,0x00,0x01]

Data [0]-[1]:	0x0003	Transaction ID
Data [2]-[3]:	0x0000	Protocol ID.
Data [4]-[5]:	0x0009	Message length
Data [6]:	0x10	the counter ID
Data [7]:	0x10	function code. Must be 0x10
Data [8]-[9]:	0x000a	address
Data [10]-[11]:	0x0001	Number of registers
Data [12]:	0x04	bytes count
Data [14]-[15]:	0x0001	data: 0x0001--close valve

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8.3.4 request to change speed

- Address: 12 (0x0c)
- Function code: 16 (0x10)
- Device ID: 16(0x10)
- Data: 60 (for example)

Data=[0x00,0x04,0x00,0x00,0x0b,0x10,0x10,0x00,0x0c,0x00,0x02,0x4,0x00,0x04,0x00,0x32]

Data [0]-[1]:	0x0001	Transaction ID
Data [2]-[3]:	0x0000	Protocol ID.
Data [4]-[5]:	0x0009	Message length
Data [6]:	0x10	the counter ID
Data [7]:	0x10	function code. Must be 0x10
Data [8]-[9]:	0x000c	address
Data [10]-[11]:	0x0001	Number of registers
Data [12]:	0x02	bytes number
Data [13]-[14]:	0x003c	speed: 60

8.3.5 request to Dump:

- Address:15 (0x0f)
- Function code: 16 (0x10)
- Device ID: 16 (0x10)
- Turntable speed: 200 (0xc8)

Data=[0x00,0x05,0x00,0x00,0x00,0x09,0x10,0x10,0x00,0x0f,0x00,0x01,0x02,0x00,0xc8]

Data [0]-[1]:	0x0005	Transaction ID
Data [2]-[3]:	0x0000	Protocol ID.
Data [4]-[5]:	0x0009	Message length
Data [6]:	0x10	the counter ID
Data [7]:	0x10	function code. Must be 0x10
Data [8]-[9]:	0x000f	address: 15 (0x0f)
Data [10]-[11]:	0x0001	Number of registers
Data [12]:	0x02	bytes number
Data [14]-[15]:	0x00c8	speed: 200

8.3.6 request to obtain the seed number

- Address: 50
- Function code: 4 (0x04)

Data=[0x00,0x06,0x00,0x00,0x00,0x06,0x10,0x04,0x00,0x32,0x00,0x01]

Data [0]-[1]:	0x0006	Transaction ID
Data [2]-[3]:	0x0000	Protocol ID.
Data [4]-[5]:	0x0006	Message length
Data [6]:	0x10	the counter ID
Data [7]:	0x04	function code. Must be 0x10
Data [8]-[9]:	0x0032	address: 50
Data [10]-[11]:	0x0001	Number of registers

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8.3.7 request to obtain the counter state

- Address: 60
- Function code: 4 (0x04)

Data=[0x00,0x07,0x00,0x00,0x00,0x06,0x10,0x04,0x00,0x3c,0x00,0x01]

Data [0]-[1]:	0x0007	Transaction ID
Data [2]-[3]:	0x0000	Protocol ID.
Data [4]-[5]:	0x0006	Message length
Data [6]:	0x10	the counter ID
Data [7]:	0x04	function code. Must be 0x10
Data [8]-[9]:	0x003c	address: 60
Data [10]-[11]:	0x0001	Number of registers

8.3.8 request to Start:

- Address:20 (0x0f)
- Function code: 16 (0x10)
- Device ID: 16 (0x10)
- Data: 1

Data=[0x00,0x08,0x00,0x00,0x00,0x09,0x10,0x10,0x00,0x14,0x00,0x01,0x02,0x00,0x01]

Data [0]-[1]:	0x0008	Transaction ID
Data [2]-[3]:	0x0000	Protocol ID.
Data [4]-[5]:	0x0009	Message length
Data [6]:	0x10	the counter ID
Data [7]:	0x10	function code. Must be 0x10
Data [8]-[9]:	0x000f	address: 15 (0x0f)
Data [10]-[11]:	0x0001	Number of registers
Data [12]:	0x02	bytes number
Data [14]-[15]:	0x0001	data:1

8.3.9 request to Stop:

- Address:25 (0x19)
- Function code: 25 (0x10)
- Device ID: 16 (0x10)
- Turntable speed: 200 (0xc8)

Data=[0x00,0x09,0x00,0x00,0x00,0x09,0x10,0x10,0x00,0x19,0x00,0x01,0x02,0x00,0x01]

Data [0]-[1]:	0x0009	Transaction ID
Data [2]-[3]:	0x0000	Protocol ID.
Data [4]-[5]:	0x0009	Message length
Data [6]:	0x10	the counter ID
Data [7]:	0x10	function code. Must be 0x10
Data [8]-[9]:	0x0019	address: 25 (0x19)
Data [10]-[11]:	0x0001	Number of registers
Data [12]:	0x02	bytes number
Data [14]-[15]:	0x0001	Data: 1

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8. 3.10 set to Zero:

- Address:30 (0x1e)
- Function code: 16 (0x10)
- Device ID: 16 (0x10)
- Turntable speed: 200 (0xc8)

Data=[0x00,0x0a,0x00,0x00,0x00,0x09,0x10,0x10,0x00,0x1e,0x00,0x01,0x2,0x00,0x01]

Data [0]-[1]:	0x000a	Transaction ID
Data [2]-[3]:	0x0000	Protocol ID.
Data [4]-[5]:	0x0009	Message length
Data [6]:	0x10	the counter ID
Data [7]:	0x10	function code. Must be 0x10
Data [8]-[9]:	0x001e	address: 30 (0x1e)
Data [10]-[11]:	0x0001	Number of registers
Data [12]:	0x02	bytes number
Data [14]-[15]:	0x0001	Data:1

8. 3.11 request to Reset:

- Address:35 (0x23)
- Function code: 16 (0x10)
- Device ID: 16 (0x10)
- Turntable speed: 200 (0xc8)

Data=[0x00,0x0b,0x00,0x00,0x00,0x09,0x10,0x10,0x00,0x23,0x00,0x01,0x02,0x00,0x01]

Data [0]-[1]:	0x000b	Transaction ID
Data [2]-[3]:	0x0000	Protocol ID.
Data [4]-[5]:	0x0009	Message length
Data [6]:	0x10	the counter ID
Data [7]:	0x10	function code. Must be 0x10
Data [8]-[9]:	0x0023	address: 35 (0x23)
Data [10]-[11]:	0x0001	Number of registers
Data [12]:	0x02	bytes number
Data [14]-[15]:	0x0001	data: 1

9. Counter state

Click Counter State button at Main Frame, the interface shows the figure 9.1 at below. This interface allow operator to check the state of the counter. The counter is default set to Carousel.

If you want to use your computer to connect to this counter, you have to de-select Carousel option.

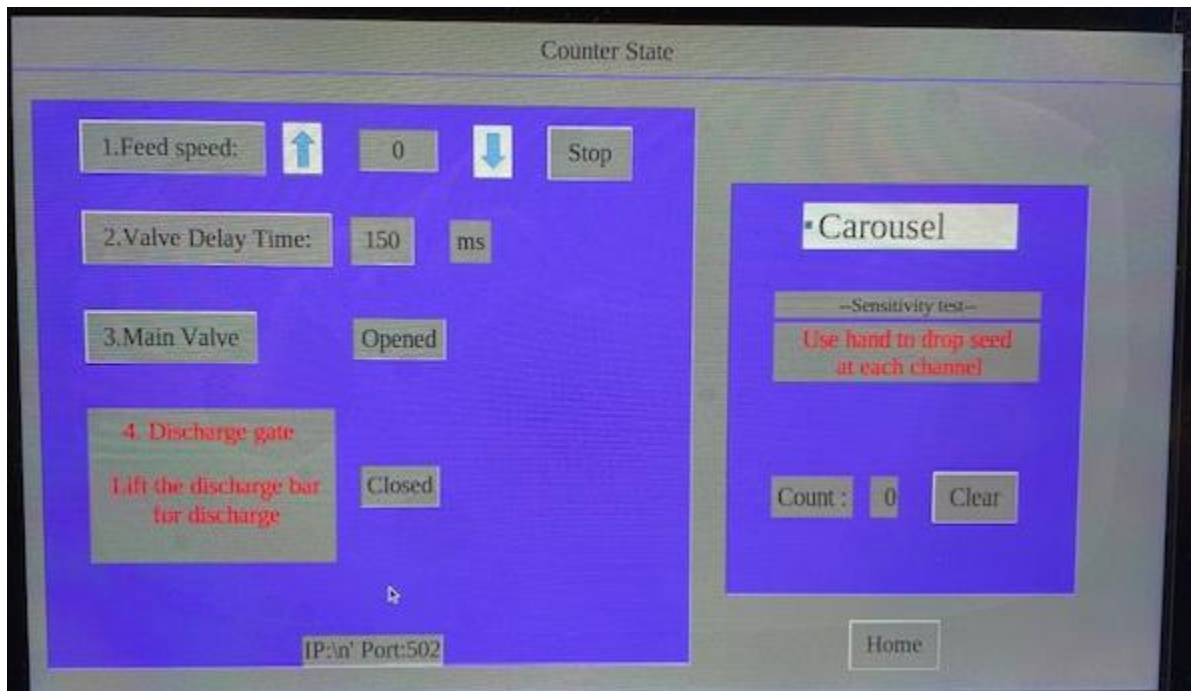


Figure 9.1

9.1 Test Feed Turntable speed

Click the button: Feed Speed, a keypad will pop out and entry speed, after that the turntable of the counter will turn at designated speed. Touch Up or Down arrow to adjust the feed speed.

0---turntable is at standstill state. 200—is maximum turntable speed.

9.2 Valve Delay Time

Valve delay time is defined as a waiting time when Valve received a close command to it actually carries out this command.

Valve delay time can be set to help control the accuracy of the batch count. The maximum delay time is 200

9.3 Test Main valve

Click Main Valve button in frame as shown above figure 9.1, you will hear the sound of the Main Valve opening or closing from the counter. If you can't hear the sound, it means the Main Valve has problem. For how to fix this problem, see Maintenance

'Opened' or 'Closed' at the right of Main Valve button indicates the current state of Main Valve.

9.4 Check Discharge Sensor

Lift Envelope Slide bar at the counter, the state "Closed" will change to "Opened". Release Envelope Slide bar, the state "Opened" will change back to "Closed".

9.5 Sensitivity test

Sensitivity is at the right side of control panel. You can use this function to test whether each channel works or not.

9.6 Protect Count Data

ESC2-TSR is capable of providing protection against the unexpected power loss. Even if misconducting. When unexpected power loss occurs during counting, the counter will retain certain time to save the count data and shutdown the counter properly.

10. Maintenance

Maintenance of the counter includes:

- clean detecting unit
- clean the main valve
- clean feeder

10.1 Clean detecting unit

The seed counter should be periodically cleaned to ensure the precision and accuracy of the counter. The chemical powder or dust accumulated on the 'windows' through where the sensor sees will affect the accuracy and precision of the counter. It is imperative to clean the chemical powder rested on the inside of the detecting unit and containers to prevent the untreated seed from contamination.

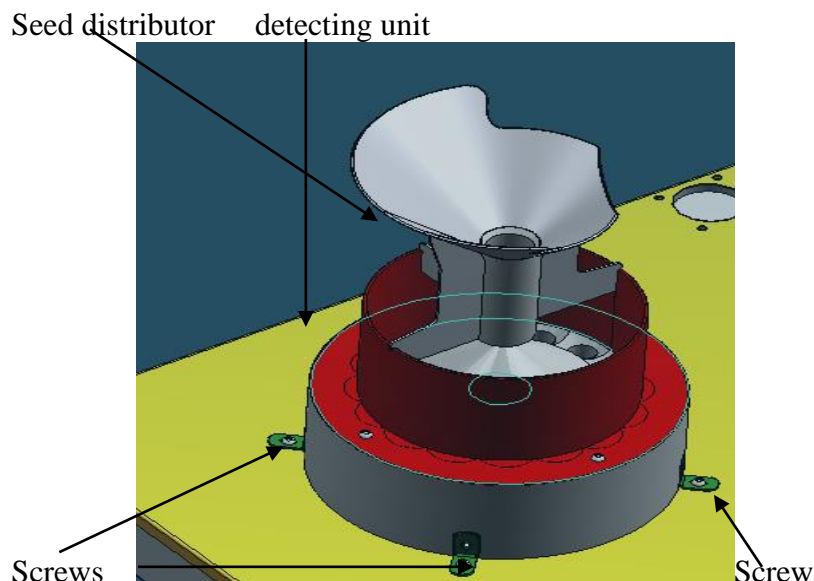
10.2 Clean the dust throughout each channel

- Use an air gun to blow each channel while simultaneously opening the end valve so that the dust, beeswing, powder or any trash can be blown out.
- After cleaning, drop a seed into each channel for testing. The control box should respond to each channel accordingly.

If you are still not satisfied with the accuracy or you are going to count untreated seed after counting the treated seed, you need to first clean the chemical powder out from the detecting unit.

10.3 Clean acrylic window tubes

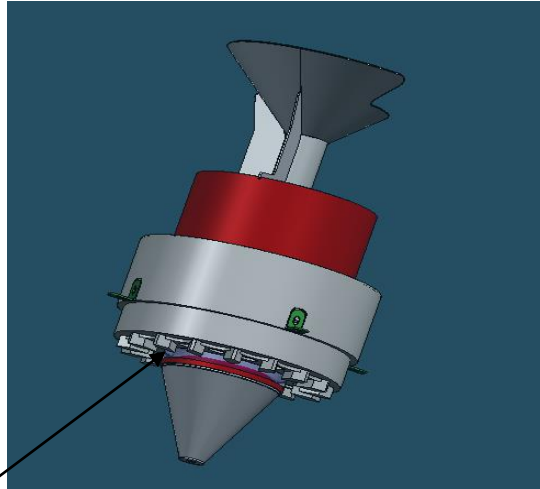
- Unplug or disconnect the seed counter from power sample.
- Unplug the number 2, 3, 4 and 5 cables at the back of the base unit.
- Remove the feeder unit from the top and place it at a secure table top.
- Remove 4 screws which anchored the distributor and pull out the seed distributor from the detector unit.



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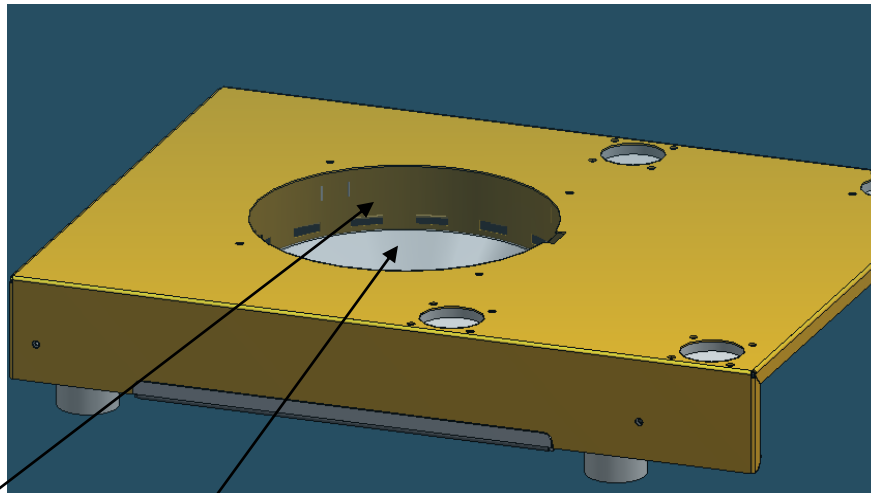
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- Use a soft paper towel or rag to clean the exterior surface of small size acrylic window tube as shown below:



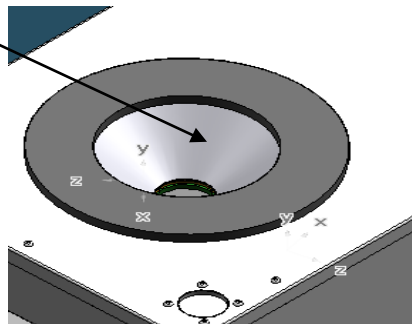
Small size acrylic tube

- Use a soft paper towel or rag to clean the inside surface of the large size acrylic window tube unit as shown below:



Larger size acrylic tube unit

- Clean valve funnel



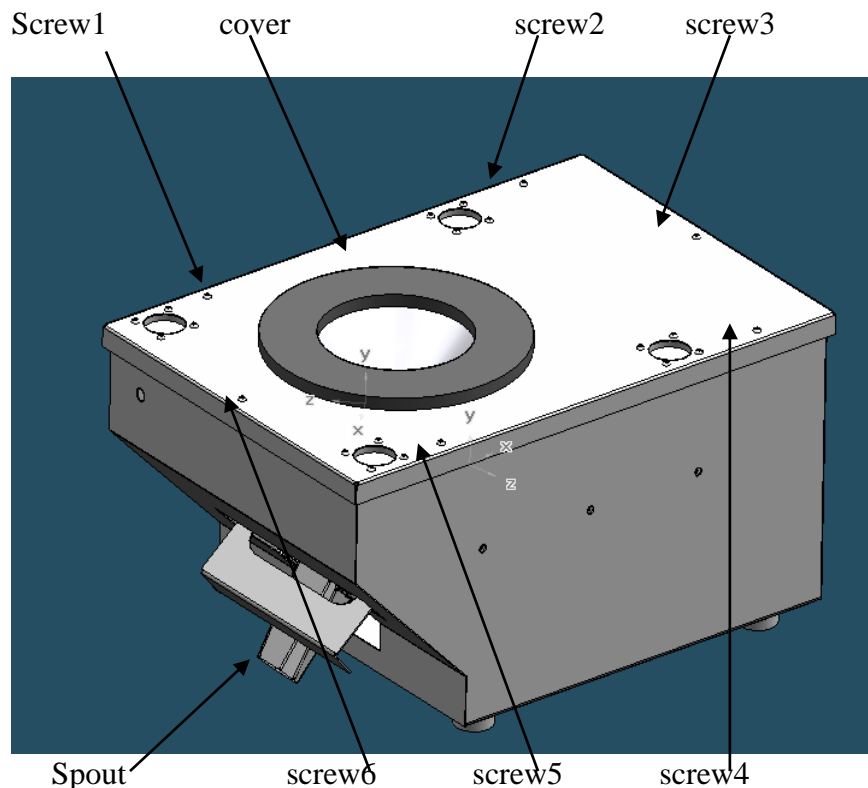
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If the count is still not accurate, the sensors may have a problem and the counter should be sent back to Agriculex Inc. for maintenance

10.5 Clean the valve plate

- When the main valve cannot be properly opened or closed you will need to clean the valve plate. See procedure below to clean the main valve plate:
- Remove the feeder unit from the top counter and place it at a secure table top;
- Remove the detector unit from the base top and place it in a secure position.
- Remove 6 screws, spout and open the cover as shown below:



- After opening the cover use an air blow gun with dry compressed air to blow the main valve and the crossing way of the main valve. Sometime you may need to use a 'WD-40' to clean some accumulated dust.
- Use your finger to open and close the valve.
- If you feel that the action of the valve close and open is free running, you can connect the control box to the base unit and turn on the power to test it.
- Clean the rest of the machine.
- Do not allow excessive amounts of spilled seed or dust collect anywhere in the unit.
- You can use a dry compressed air in 'hard-to-reach spots'.
- Do not use amounts of liquid that could drip inside, and do not use flammable solvents.

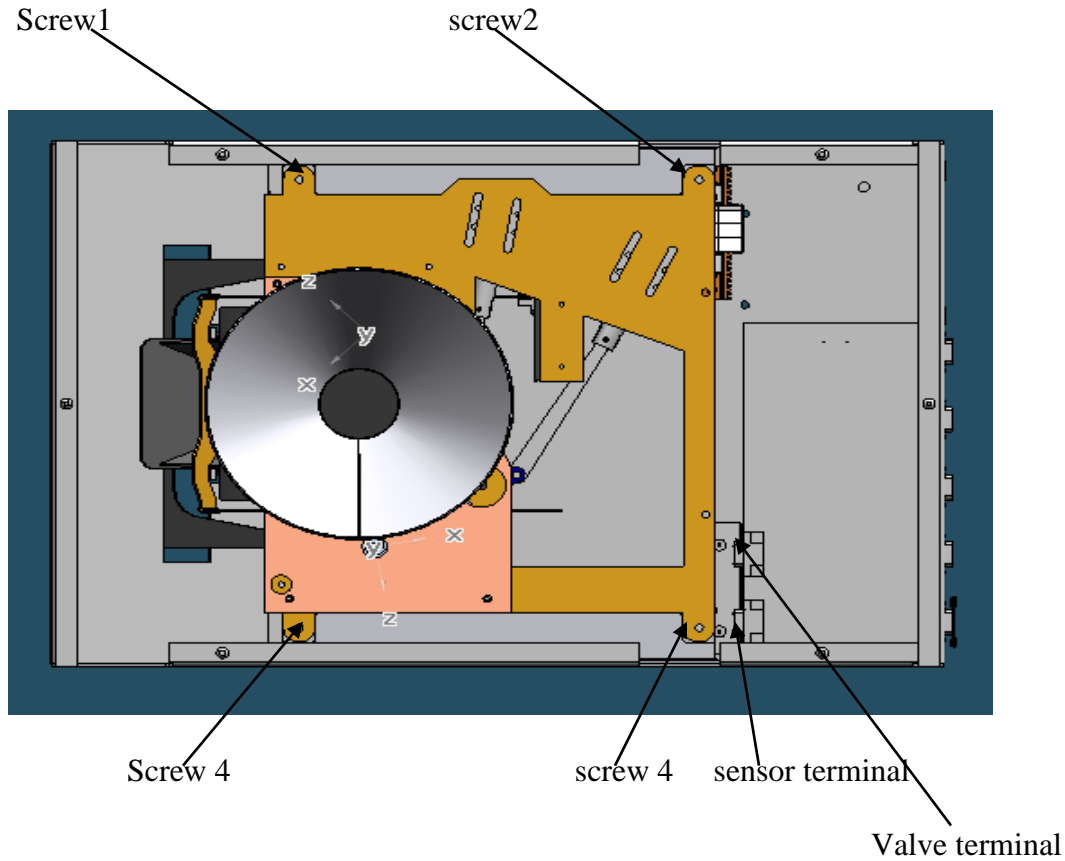
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- The valve can not open or close

If the valve's open or close still has problem, you will need to clean the dust on the crossing way of the valve.

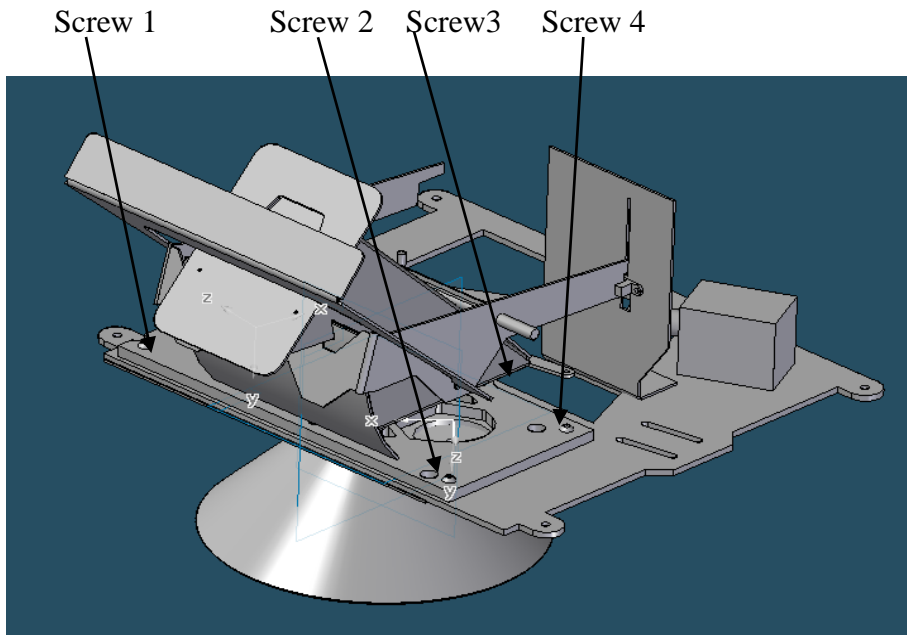
- Unplug the sensor and valve terminals.
- Remove four screws



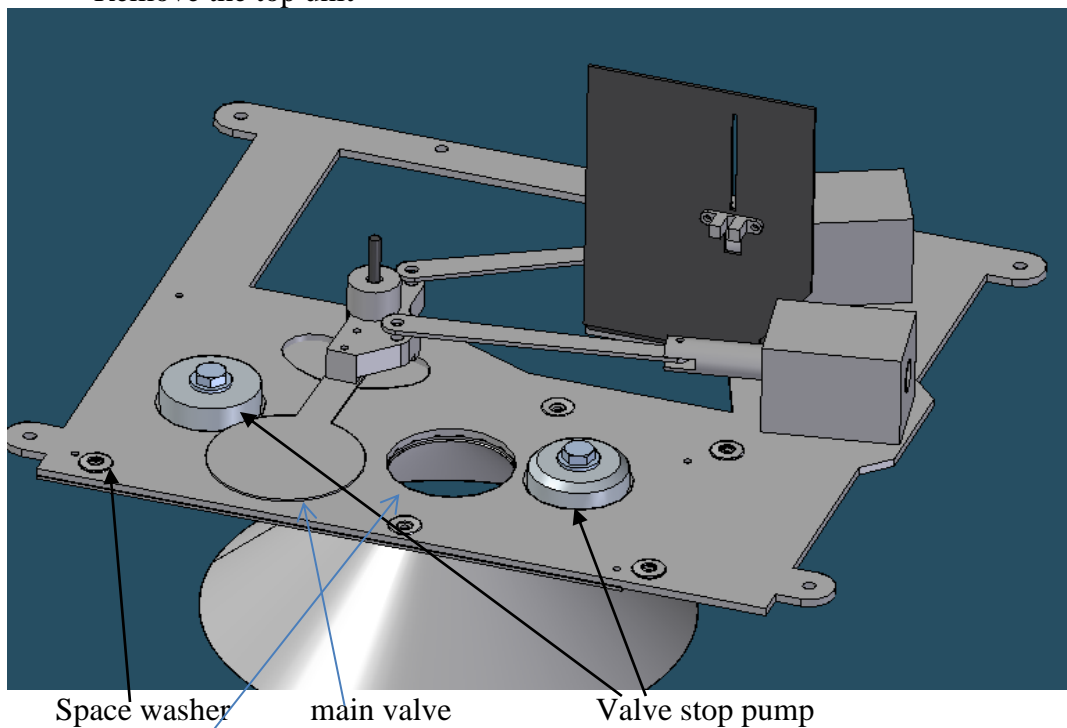
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- Take off Base Integration from the base unit and place it on the table:
 - o Remove the 4 screws

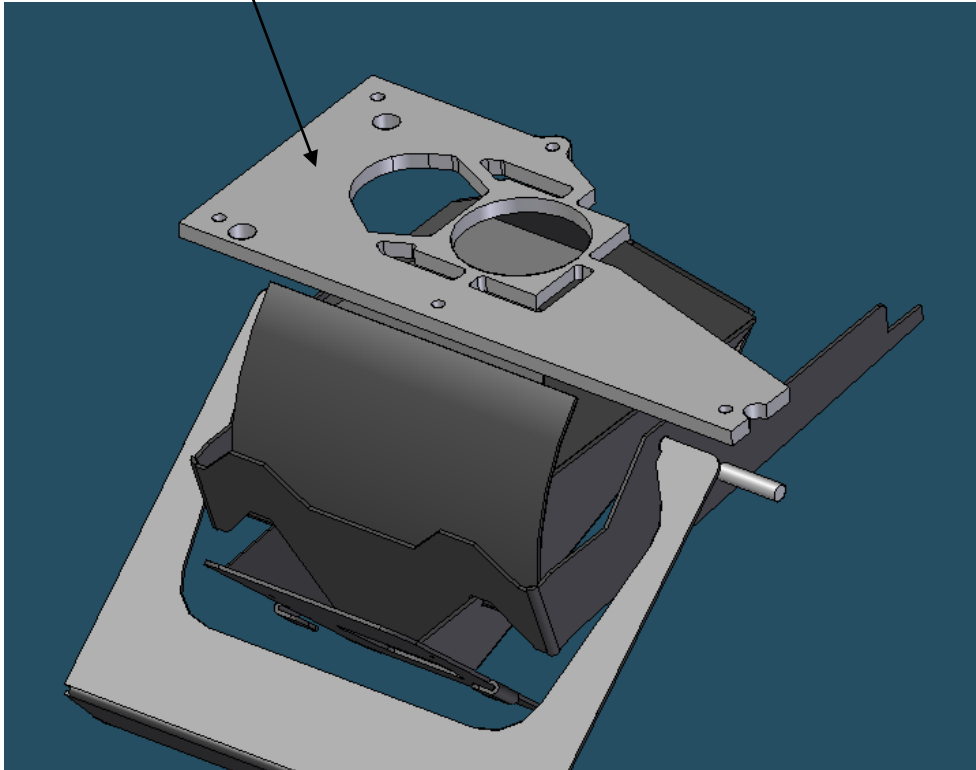


- Remove the top unit



Clean the surface.
Do not lose these washers.
Check bumper condition

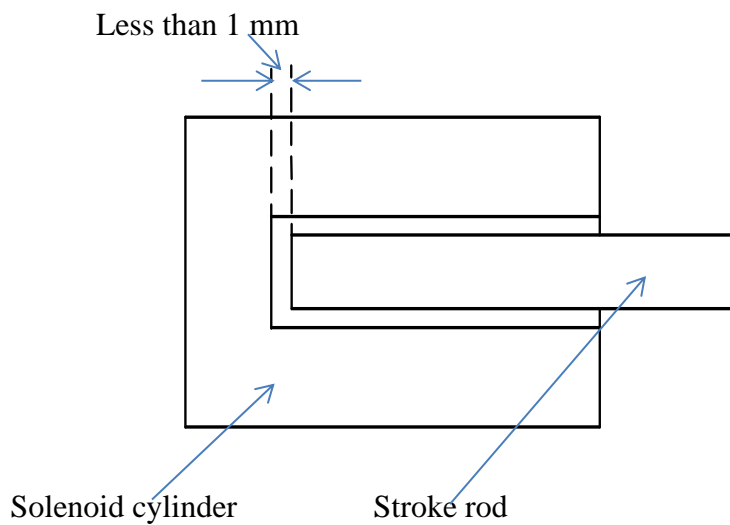
Clean the surface



- After cleaning re-assemble the unit.

10.6 Reset position

Sometimes you may need to reset the position between the stroke rod and the solenoid cylinder body.



11 Setup Recommendations

ESC-2 Programmable Electronic Seed Counter for counting Soybean:

1. Vertical gate set at # 8 to 10
2. Horizontal gate set at # 12
3. Sensitivity set at #5 to 6
4. Feed turntable speed at 35 to 45
5. Batch counting, the feed turntable high speed and low speed use default values

ESC-2 Programmable Electronic Seed Counter for counting Corn:

1. Vertical gate set at # 10 to 15
2. Horizontal gate set at # 15
3. Sensitivity set at # 6 to 7
4. Feed turntable speed at 40 to 55
5. Batch counting, the feed turntable high speed and low speed use default values

ESC-2 Programmable Electronic Seed Counter for counting Canola:

1. Vertical gate set at # 0 to 1
2. Horizontal gate set at # 1 to 2
3. Sensitivity set at # approximate 1.5
4. Feed turntable speed at 10 to 20
5. Batch counting, the feed turntable high speed and low speed use default values