S-4 Semi-Automatic Weigh/Fill System User's Manual

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S-4 Weigh/Fill System

What is the Logical Machines S-4?

The S-4 is used to fill containers with an operator specified amount (weight) of product from a supply hopper. It can be used in an **Automatic** mode where the Logical Controller II determines the operating parameters or in a **User** mode where the operator supplies the operating parameters.

In the **Automatic** mode the operator tells the S-4 how much product he/she would like in the container fills the machine with product and presses the footswitch. The S-4 will automatically "learn" how to fill the container optimizing for accuracy and speed.

In **User** mode the operator can manually input all of the machine parameters. With a little experience **User** mode can be quicker and more accurate than **Automatic** mode.

Unpacking & Assembling Your New S-4

Some setup is necessary when unpacking and assembling your S-4 for the first time.

Remove packing material
- Install the 4 casters on the bottom of the machine. Use a 9/16" wrench to tighten.

Remove the travel locks.
- These are C-clamps on the left and right side of the Discharge Funnel/ Weigh hopper. They secure the Weigh Hopper during shipment and must be removed before using the S-4.

Reposition the controller box.
- Unbolt the controller from its traveling position. Using the same nut and bolt mount it on the right front vertical tube of the chassis using the 1/4" hole. The toothed nut should be in contact with the square tube chassis. This will require two 7/16" wrenches.

Attach compressed air supply.
- The S-4 regulator is factory preset at 25-30 psi. The S-4 has a male industrial shape hose coupler. A female industrial shape hose coupler is required to connect compressed air to the S-4.

Table of Contents:

Plug in the controller.
- Plug the power cord into a 120V outlet. Due to the high precision of our Controller, we recommend using a power conditioner if available.

Getting to know the S-4

Supply Hopper
This large stainless steel hopper is where you will put your bulk product.

Supply Hopper Gate
This is an adjustable gate located on the Supply Hopper that controls the level of the product flowing on the Feed Pan. The S-4 comes with two different size Supply Hopper Gates.

Feed Pan/Vibrator Assembly
The product flows down from the Supply Hopper onto the Feed Pan. The vibrator shakes the Feed Pan moving the product into the Weigh Hopper.

Optional Dribble Gate
The purpose of the optional Dribble Gate is to restrict the flow of product during the dribble cycle.

Weigh Hopper
The Weigh Hopper acts as a scale by accumulating and weighing product during each fill cycle.

Discharge Funnel
The product flows into your container through the Discharge Funnel. Depending on your machine configuration, you may have a Discharge Chute or other spout options.

Logical Controller II
The Logical Controller II is the "brain" of the S-4. It controls the speed of the vibrator motor and interfaces with the operator through the footswitch, keypad, and LCD screen.

Footswitch
The footswitch will normally sit on the floor. The footswitch is used by the operator to start a fill cycle. If it is pressed before the Weigh Hopper is filled, the S-4 will pause. Pressing the footswitch again will resume the fill cycle.

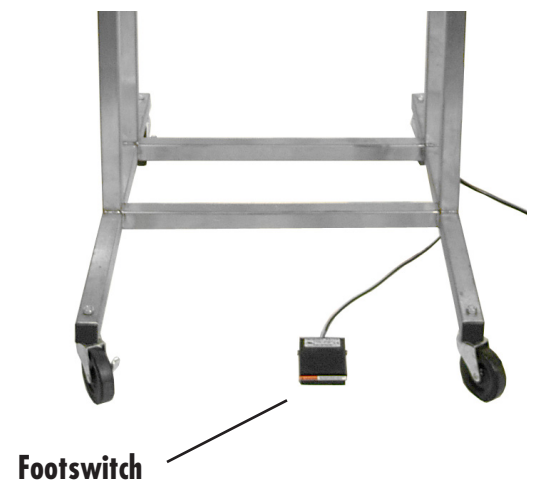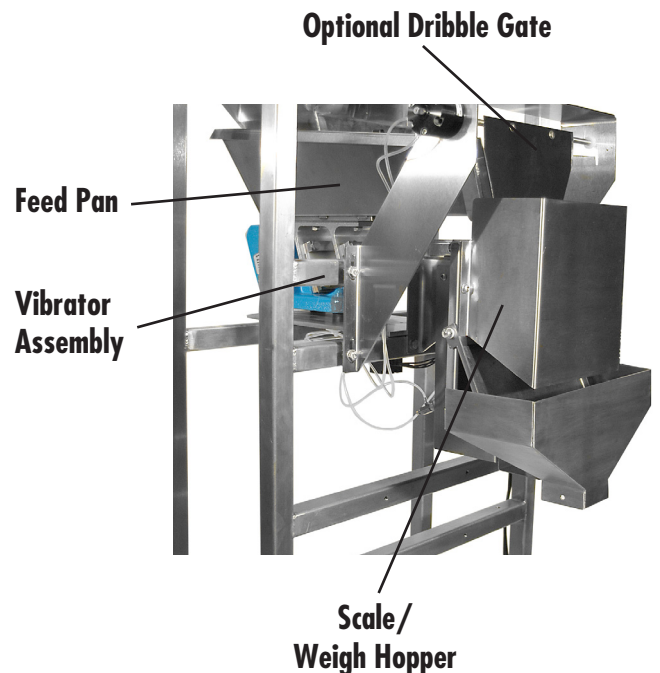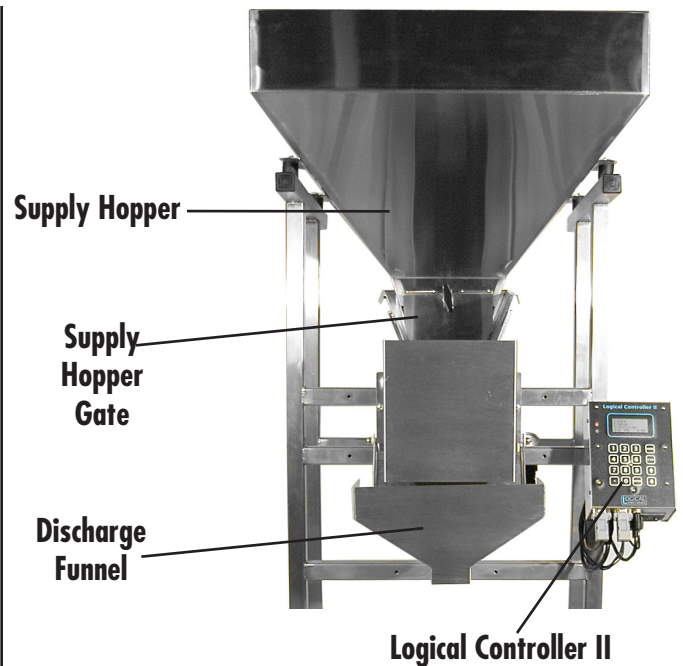# Getting to Know the S-4 Logical Controller II

Power Switch
The power switch is located on the bottom of the Controller.

LCD Screen
The LCD screen is a 4 line by 16 character display that is used by the Controller to communicate to the user.

Supply Hopper

Supply Hopper Gate

Discharge Funnel

Logical Controller II

Optional Dribble Gate

Feed Pan

Vibrator Assembly
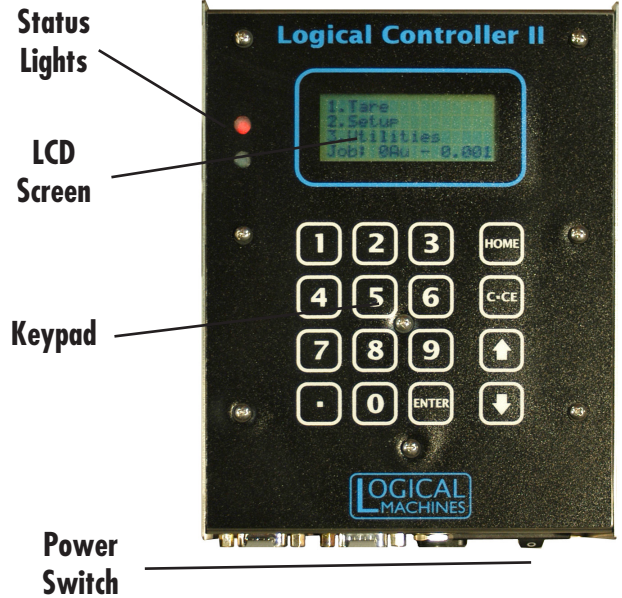
Scale/ Weigh Hopper

Footswitch

Keypad

The Keypad is used by the operator to communicate with the Controller. The keys **0** thru **9** , **"."** and **ENTER** are used to make menu selections and to enter values. The **C/CE** key is used to clear an accidentally entered value while entering a new parameter. The up and down arrow keys are used for scrolling through menus or data. The **HOME** key takes you back to the main menu from any screen anytime. For example, no matter what screen you are on, pressing **HOME, 1** will tare the scale. Pressing **HOME, 2, 4** will save the current job.
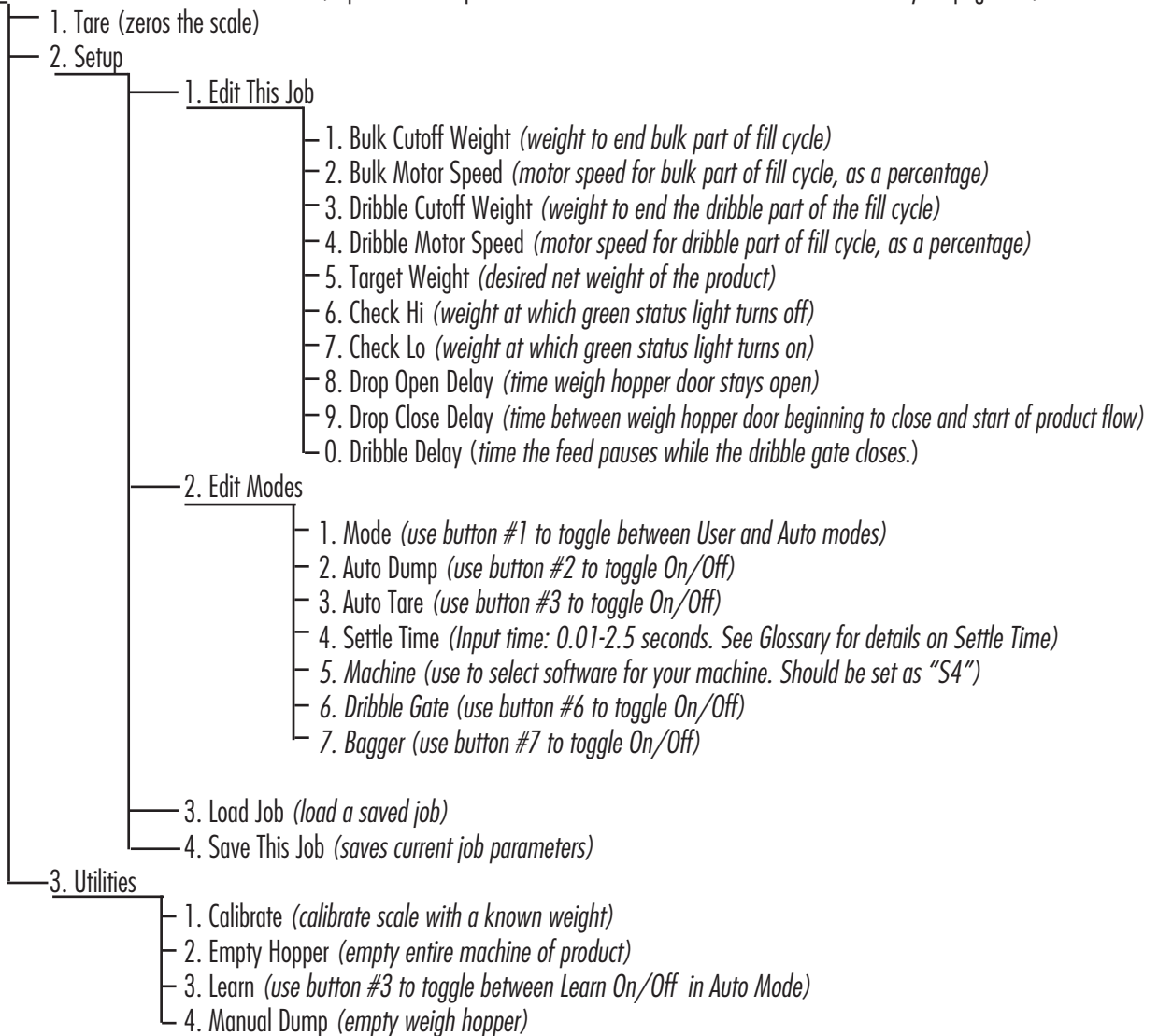
Fuse

The fuse is located in the power entry block next to the power switch. The power cord must be removed to replace the fuse. If there is no display when the power switch is turned on, remove the fuse and visually inspect the condition. If the fuse is blown, replace it with a fuse of the correct value (4 amps). Your new machine includes a spare fuse in the power entry block.

Status Lights

LCD Screen

Keypad

Power Switch

Controller Menu Tree

Home Screen

(Expanded descriptions of all menu items can be found in the Glossary on page 13.)

— 1. Tare (zeros the scale)
— 2. Setup
    — 1. Edit This Job
       — 1. Bulk Cutoff Weight *(weight to end bulk part of fill cycle)*
       — 2. Bulk Motor Speed *(motor speed for bulk part of fill cycle, as a percentage)*
       — 3. Dribble Cutoff Weight *(weight to end the dribble part of the fill cycle)*
       — 4. Dribble Motor Speed *(motor speed for dribble part of fill cycle, as a percentage)*
       — 5. Target Weight *(desired net weight of the product)*
       — 6. Check Hi *(weight at which green status light turns off)*
       — 7. Check Lo *(weight at which green status light turns on)*
       — 8. Drop Open Delay *(time weigh hopper door stays open)*
       — 9. Drop Close Delay *(time between weigh hopper door beginning to close and start of product flow)*
       — 0. Dribble Delay *(time the feed pauses while the dribble gate closes.)*
    — 2. Edit Modes
       — 1. Mode *(use button #1 to toggle between User and Auto modes)*
       — 2. Auto Dump *(use button #2 to toggle On/Off)*
       — 3. Auto Tare *(use button #3 to toggle On/Off)*
       — 4. Settle Time *(Input time: 0.01-2.5 seconds. See Glossary for details on Settle Time)*
       — 5. Machine *(use to select software for your machine. Should be set as "S4")*
       — 6. Dribble Gate *(use button #6 to toggle On/Off)*
       — 7. Bagger *(use button #7 to toggle On/Off)*
    — 3. Load Job *(load a saved job)*
    — 4. Save This Job *(saves current job parameters)*
— 3. Utilities
    — 1. Calibrate *(calibrate scale with a known weight)*
    — 2. Empty Hopper *(empty entire machine of product)*
    — 3. Learn *(use button #3 to toggle between Learn On/Off in Auto Mode)*
    — 4. Manual Dump *(empty weigh hopper)*

Operating Your S-4

Confirm the Weigh Hopper is Empty

If there is any product in the Weigh Hopper it can be emptied by pressing **HOME, 3, 4** (fig 1). This keystroke will open the Weigh Hopper Drop Gate for a couple seconds to empty the Weigh Hopper.

Tare the Scale

With nothing in/on the Weigh Hopper, press **HOME, 1** to tare or zero out the scale. After doing this, the weight display should read "0.000" (fig. 1). Note that, due to the sensitivity of our weighing equipment, you may find that a breeze or vibration from other machinery may cause a fluctuation of 0.001 or so.

Confirm Calibration on your S-4

Place a **known weight*** in/on the Weigh Hopper and check the accuracy. You should see the weight of your known weight displayed in the lower right hand corner of the display. From the factory, the S-4 is calibrated in pounds. If you find that the Controller is not displaying the correct weight, or if you want to calibrate your machine in a different unit of measure, see page 12 for calibration instructions. If, after calibrating, your S-4 is reading a negative weight or zero weight, see the second column in the *Tips from the Experts* section located at the end of this manual.

*What's a "**known weight**"? A known weight can be any object – a calibration weight, a book, a shoe, your watch – as long as you know how much it weighs.

Press: HOME, 3, 4

Fig. 1: Screen showing Manual Dump command

```
1.Calibrate
2.Empty Hopper
3.Learn Is N/A
4.Manual Dump
```

Press: HOME, 1

Fig. 2: Home screen indicating that scale has been tared to zero

```
1.Tare
2.Setup
3.Utilities
Job:1Us    0.000
```

User Mode

We recommend that new users familiarize themselves by operating the S-4 in User mode, thereby gaining a more complete understanding of how all of the machine's parameters work together. When using the Logical Controller II in **User** mode, the operator must input all of the job parameters.

The Weigh Process

In **User** mode, the Logical Controller II fills a major portion of the target weight at a high speed (**Bulk Speed**) until it reaches a specific weight (**Bulk Cutoff**). It then operates at a slower speed (**Dribble Speed**) until it reaches a terminal weight (**Dribble Cutoff**). The terminal weight is usually a bit less than the target weight because a small amount of product is in free-fall.

For example, if an operator was filling bags with 5 pounds of rice, they might program the Controller to fill the first 4.75 pounds at a high vibrator motor speed. The Bulk Cutoff would be 4.75 pounds and the Bulk Speed might be 70% of full motor speed. The remaining 0.25 pounds of product might then get filled at a lower vibrator motor speed. The operator might program a Dribble Speed of 40% and a Dribble Cutoff of 4.98 pounds guessing that the final 0.02 pounds will fall into the Weigh Hopper after the controller turns off the vibrator motor.

The following is a step-by-step description of operating the S-4 in **User** mode.

Turn on the Logical Controller II

Every time the Logical Controller II is turned on, the LCD screen displays a short "splash" screen (fig. 3) that indicates the machine model number and software revision number. You should see a line like "S4 Rev 2.072". In this example, "S4" tells you that the Controller is setup for the Model S-4 machine. If this first part shows "S5", "S6" or "S7", refer to the Glossary section at the end of the manual to change it to "S4". The "Rev 2.072" indicates the software revision in the Controller (2.072 in this example). Write this down so that if you need to call Logical Machines with a question, we will know which machine and software revision you have.

Once the "splash" screen has passed, the Home screen (fig. 4) will show a short menu, a "Job Number", an indication of whether the current job is **Automatic** or **User**, and the weight indicated by the scale.

A "Job" is a set of parameters that tell the Controller how to fill a specific container with a particular amount of product. The "Job Number" is the job currently being used. The Controller can store several Jobs that the operator has setup and saved in its memory. The operator can recall these jobs later on. All saved Jobs are retained when the power is removed.

There are 2 characters after the job number. They will either be "Au" indicating that the currently loaded Job is an **Automatic** mode job or "Us" indicating the current job is a **User** mode job. An **Automatic** Job means the Controller will constantly adjust the job parameters during operation and a **User** Job will use fixed operator supplied parameters and will make no adjustmemts.

Bulk Speed, Bulk Cutoff, Dribble Speed, Dribble Cutoff—these can be confusing terms! You can think of it this way:

Imagine that you're piloting a motor boat across a big lake with a load of stuff. As you're crossing the lake to your destination, you want to go quickly so your boat's throttle is opened up and you're going fast (your **Bulk Speed**). As you approach the dock, you have to start slowing down (so you don't crash!) so you pull back on the throttle to get to a safe speed as you near the dock (your **Dribble Speed**).

Bulk Cutoff simply refers to the weight at which the machine will go from Bulk Speed to its Dribble Speed (you're approaching the dock...) **Dribble Cutoff** is the weight at which the motor shuts off (you're at the dock...) allowing the last of the product that has left the feed pan to fall into the Weigh Hopper.

Example Starting Parameters:	
Target Weight	**1.25 lb**
Bulk Cutoff	**0.95 lb**
Bulk Speed	**65%**
Dribble Cutoff	**1.23 lb**
Dribble Speed	**40%**

You can use these ratios as a starting point for most products

Fig. 3: Startup "splash" screen showing controller software version number

```
Logical Machines
S4 Rev 2.072
```

Fig. 4: "Home" screen showing Job Number, Automatic or User modes, and weight of product currently in the Weigh Hopper

```
1.Tare
2.Setup
3.Utilities
Job:0Us    0.000
```

Job Number   **Mode Indicator**   **Current Weight**

The weight of the product currently in the Weigh Hopper will be shown on the bottom right corner of the LCD screen. When the scale is connected, you should be able to make this weight change by pressing on the Weigh Hopper.

Load a Job

For this example we will load Job number 1. To load Job number 1 from the controllers memory press **HOME, 2, 3** to get to the Load Job screen (fig. 5). You will be asked to input the Job Number that you want to load. Press **1** and then **ENTER** to load the parameters currently saved in Job 1. After pressing **ENTER** you will be returned to the Home screen. Notice that the bottom line of the display starts with "Job: 1" (fig. 6). This is telling you that Job Number 1 is being used.

Set the Operating Modes

Now we need to confirm that the Controller is operating in **User** mode for this Job. This causes the Controller to use operator supplied parameters. Press **HOME, 2, 2** to get to the "Edit Modes" menu (fig. 7). The first item in this menu should be "Mode". If necessary, press **1** to toggle the mode from "Auto" to "User".

While you are in this menu, notice the other menu items. For initial setup, Auto Dump and Auto Tare should be off. Confirm these settings. If necessary, press **2** to toggle the "AutoDump" setting to "Off". Press **3** to toggle the "AutoTare" setting to "Off". Press **4** to input the Settle Time. This is the time given to the Controller to evaluate the final weight. We have found that 1.0 second is a good settle time for most products.

Arrow down to the second page in the Edit Modes menu. Here you will find settings for your machine type which should read "S4". You will also see the option to turn the Dribble Gate on/off and the Bagger on/off. If your machine is equipped with a Dribble Gate, toggle the Dribble Gate "On" using **6**. Bagger should only be used if your machine is integrated with a conveyor or bagger machine.

Once you have made the above changes to the operating Modes, press **HOME** to go back to the home screen.

Set the Bulk Cutoff Weight

If we are running the Job described above we will want to input the Bulk Cutoff weight of 4.75 lbs. Press **HOME, 2, 1** to get to the Job menu. Press **1** to edit the Bulk Cutoff Weight (fig. 8). If you make a mistake while entering the parameter, press **C/CE** to clear your entry and reinput the parameter. Input the desired Bulk Cutoff Weight and press **ENTER** to confirm. (Your Model S-4 comes calibrated in pounds. If you wish to change to a different unit of measure, see the section on calibration.) You will be returned to the Edit Job menu. You can use the arrow keys to view all of these parameters.

Set the Bulk Speed

If you are not already at the Edit Job menu, press **HOME, 2, 1**. Press **2** to edit the Bulk Speed (fig. 9). Input the desired Bulk Speed and press **ENTER** when you are done. (Both Bulk and Dribble speeds are displayed as a percentage. In this case, full speed is 99%.)

Press: Home, 2, 3

Fig. 5: Load Job screen

```
ENTER Job Number
Current:       0
Input(0-99)->1
```

Press: 2, ENTER

Fig. 6: Home screen indicating Job 1 is current job number

```
1.Tare
2.Setup
3.Utilities
Job:1Us    0.000
```

Press: HOME, 2, 2; then press 1 to toggle mode

Fig. 7: Edit Modes screen with mode toggled to "User"

```
1.Mode = User
2.AutoDump = Off
3.AutoTare = Off
4.Settle = 1.00
```

```
5.Machine = S4
6.DribGate = Off
7.Bagger = Off
```

Press: Home, 2, 1; then 1

Fig. 8: Bulk Cutoff Weight edit screen. Input value here

```
Bulk Cutoff
Current:0.400
Input->
```

Press: 2, 1; then 2

Fig. 9: Bulk Speed edit screen. Input value here

```
Bulk Motor Speed
Current: 99
Input->
```

Set the Dribble Cutoff Weight

If you are not already at the Edit Job menu, press **Home, 2, 1**. Press **3** to edit the Dribble Cutoff weight (fig. 10). Input the desired Dribble Cutoff weight and press **ENTER** to confirm.

Set the Dribble Speed

If you are not already at the Edit Job menu, press **Home, 2, 1**. Press **4** to edit the Dribble speed (fig. 11). Input the desired Dribble Speed and press **ENTER** to confirm.

Set the Target Weight

If you are not already at the Edit Job menu, press **Home, 2, 1**. (You can use the up and down arrow keys to view all the parameters.) Press **5** to edit the Target Weight (fig. 12). Input the desired Target Weight and press **ENTER** to confirm.

Set Check High & Check Low

If you are not already at the Edit Job menu, press **Home, 2, 1**. Press the **6** and **7** keys respectively to adjust the Check Hi & Check Lo settings. This sets the weight at which the green light turns on (Lo) and off (Hi). (See the Glossary for a more thorough explanation.)

Set the Drop Gate Open Time

The Drop Gate Open Time is the time, in seconds, that the controller leaves the gate open. This and the Drop Gate Close Time can be adjusted to optimize cycle speed. If you are not already at the Edit Job menu, press **Home, 2, 1**. Press **8** to edit the Drop Gate Open Time (fig. 13). Input the desired Open Time and press **ENTER** to confirm. We find that 1.0 seconds is a good starting point for most products.

Set the Drop Gate Close Time

The Drop Gate Close Time is the time, in seconds, between the door beginning to close and the start of the product flow. If you are not already at the Edit Job menu, press **Home, 2, 1**. (You can use the up and down arrow keys to view all the parameters.) Press **9** to edit the Drop Gate Close Time (fig. 14). Similar to the Drop Gate Open Time, we find that 1.0 seconds is a good starting point for most products.

Save the Job

You should now save the job so that you don't lose job parameters if you turn off the machine or lose power. ***The S-4 does not automatically save your job parameters!*** To do this simply press **HOME, 2, 4** (fig. 15.) This will save all of the current Job parameters so that the next time you load this job from the Controller's memory, it will operate just as it did the last time you saved the job. We recommend that you save your Job anytime you make a change to it.

> Be sure to Save your Job! The S-4 will not do it for you!

Press: HOME, 2, 1; then 3

Fig. 10: Dribble Cutoff edit screen. Input value here

```
Dribble Cutoff
Current: 0.490
Input->
```

Press: HOME, 2, 1; then 4

Fig. 11: Dribble Speed edit screen. Input value here

```
Dribble Speed
Current: 40
Input->
```

Press: HOME, 2, 1; then 5

Fig. 12: Target Weight edit screen. Input value here

```
Target Weight
Current: 0.50
Input->
```

Press: HOME, 2, 1; then 8

Fig. 13: Drop Gate Open Time edit screen

```
Drop Open Time
Current:    1.0
Input->
```

Press: HOME, 2, 1; then 9

Fig. 14: Drop Gate Close Time edit screen

```
Drop Close Time
Current:    1.0
Input->
```

Press: HOME, 2, 4

Fig. 15: Setup screen showing "Save This Job" command

```
1.Edit This Job
2.Edit Modes
3.Load Job
4.Save This Job
```

Tare the Scale

With nothing on the Scale, press **HOME, 1** to tare or zero out the Scale. After doing this, the display should read "0.000" (fig. 13). This removes any offset in the scale so that anything you now put on the scale will be weighed from a value of zero.

Note that, due to the sensitivity of our weighing equipment, you may find that a breeze or vibration from other machinery may cause a fluctuation of 0.001 or so.

Confirm Calibration of the Scale

Place a known weight on the Scale to check the accuracy. You should see the weight of your known weight displayed in the lower right hand corner of the display. From the factory the S-5 is calibrated in pounds. If you find that the Controller is not displaying the correct weight, or if you want to calibrate your machine in a different unit of measure, see page 12 for calibration instructions. If your S-5 is reading a negative weight or zero weight, see the Tips From The Experts section located at the end of this manual.

Put some product in the Supply Hopper

Put your product in the Supply Hopper. It should flow down into the Feed Pan/Vibrator. We recommend filling the Supply Hopper at least half way to achieve consistent flow.

Adjust the Supply Hopper Gate

Adjust the Supply Hopper Gate to a height such that you have the shallowest consistent flow possible. This will give you the greatest control over the flow of product into your container. You may have to adjust this later on.

Press the Footswitch

Press the footswitch to start the fill cycle. The Drop Gate will open and close and the vibrator will start. If you have the optional Dribble Feed Gate, it will open. The Logical Controller II will use the supplied parameters to fill the Weigh Hopper. When the Weigh Hopper has been filled the screen will indicate the job is done and display the weight in the Weigh Hopper. Press the footswitch again to dump the product and begin another cycle.

Fine Tuning

If you find the vibrator is running very fast and/or it takes a long time for the Weigh Hopper to fill, the Supply Hopper Gate may be restricting the product in the Supply Hopper. On the other hand, if the Weigh Hopper fills quickly and is not very accurate, the Supply Hopper Gate may not be restrictive enough and should be lowered. Generally the Feed Pan should contain one layer of product when the Weigh Hopper is filling. For example, if you are filling a container with beans, you should observe a continuous flow of beans in the Feed Pan, one bean deep that flows smoothly and evenly. If there are gaps or open spots where you can see the bottom of the Feed Pan, you should raise the Supply Hopper Gate. There are two gate sizes included with the machine to allow for more adjustability. For more helpful hints on getting the most out of your S-4 see the "Tips from the Experts" section.

Press: HOME, 1

Fig. 16: Home screen indicating that scale has been tared to zero

```
1.Tare
2.Setup
3.Utilities
Job:lUs   0.000
```

Supply Hopper Gate

Feed Pan

> **Be sure to Save your Job! The S-4 will not do it for you!**

Save the Job

You should now save the job so that you don't lose job parameters if you turn off the machine or lose power. ***The S-4 does not automatically save your job parameters!*** To do this simply press **HOME, 2, 4** (fig. 15.) This will save all of the current Job parameters so that the next time you load this job from the Controller's memory, it will operate just as it did the last time you saved the job. We recommend that you save your Job anytime you make a change to it.

Automatic Mode

Automatic mode allows the Logical Controller II to adjust itself for optimum performance. This requires the input of only three Job parameters. We will first setup a new job filling 0.50 lb containers in **Automatic** mode.

Load a Job

For this example we will laod job number 2. To load job number 2 from the Controller's memory, press **HOME, 2, 3** to get to the Load Job screen (fig. 17). You will be asked to input the Job number you want to load. Press **2** and then **ENTER** to load the parameters currently saved in Job number 2. Pressing **ENTER** will return you to the Home screen (fig. 18). Notice that the bottom line of the display starts with "Job: 2". This is telling you that job number 2 is being used.

Set the Operating Modes

Now we need to confirm that the Controller is operating in **Auto** mode for this Job. Press **HOME, 2, 2** to get to the "Edit Modes" menu (fig. 7). The first item in this menu should be "Mode". If necessary, press **1** to toggle the mode from "User" to "Auto".

While you are in this menu, notice the other menu items. For initial setup, Auto Dump and Auto Tare should be off. Confirm these settings. If necessary, press **2** to toggle the "AutoDump" setting to "Off". Press **3** to toggle the "AutoTare" setting to "Off". Press **4** to input the Settle Time. This is the time given to the Controller to evaluate the final weight. We have found that 1.0 seconds is a good settle time for most products.

Arrow down to the second page in the Edit Modes menu. Here you will find settings for your machine type which should read "S4". You will also see the option to turn the Dribble Gate on/off and the Bagger on/off. If your machine is equipped with a Dribble Gate, toggle the Dribble Gate "On" using **6**. Bagger should only be used if your machine is integrated with a conveyor or bagger machine.

Once you have made the above changes to the operating Modes, press **HOME** to go back to the home screen.

Set Target Weight

Since we are going to run in Automatic mode for this example, the first parameter we need to adjust is the Target Weight. Press **HOME, 2, 1, 5** to navigate to the Target Weight entry screen (fig. 20). This will prompt you to input a Target Weight. Input "0.5" followed by the **ENTER** key. You will now be returned to the Job parameter menu which shows all of the operating parameters. Since we will be running in Automatic mode you will not have to change the Bulk and Dribble Cutoff and Speeds. (You can use the arrow keys to view all of these parameters.)

(Optional) Set Check High & Check Low

If you are not already at the Edit Job menu, Press **HOME, 2, 1**. Press the **6** and **7** keys respectively to adjust the Check High & Check Low settings. This sets the weight at which the green light turns on (Lo) and off (Hi). (See the Glossary for a more thorough explanation.)

Press: HOME, 2, 3

Fig. 17: Load Job screen

```
ENTER Job Number
Current:       0
Input(0-99)->
```

Press: 1, ENTER

Fig. 18: Home screen indicating Job 2 is current job number

```
1.Tare
2.Setup
3.Utilities
Job:2Au    0.000
```

Press: HOME, 2, 2; then press 1 to toggle mode

Fig. 19: Edit Modes screen showing Mode, Auto Dump and Auto Tare settings

```
1.Mode = Auto
2.AutoDump = Off
3.AutoTare = Off
4.Settle = 1.00
```

Press: HOME, 2, 1, 5

Fig. 20: Target Weight entry screen with "0.5" input.

```
Target Weight
Current: 0.700
Input-> 0.5
```

Set the Drop Gate Open Time

The Drop Gate Open Time is the time, in seconds, that the controller leaves the gate open. This and the Drop Gate Close Time can be adjusted to optimize cycle time. If you are not already at the Edit Job menu, Press **HOME, 2, 1**. Press **8** to edit the Drop Gate Open Time (fig. 21). Input the desired Drop Gate Open Time and press **ENTER** to confirm. You will be returned to the parameter edit list. (You can use the arrow keys to view all of these parameters.)

Set the Drop Gate Close Time

The Drop Gate Close Time is the time, in seconds, between the door beginning to close and the start of the product flow. If you are not already at the Edit Job menu, Press **HOME, 2, 1**. You can use the up and down arrow keys to view all the parameters. Press "9" to edit the Drop Gate Close Time (fig. 22). Input the desired Close Time and press **ENTER** to confirm. You will be returned to the Edit Job menu.

Turn On Learn Mode

The last thing we need to do is to tell the Controller to do a Learn Cycle. The Learn Cycle is done the first time a new Job is run in Automatic mode so the Controller can get a "feel" for how the product flows. The Controller is actually learning on every cycle if it is running in Automatic mode, but for the very first cycle we will tell it to very carefully learn the characteristics of the product and how it flows.

To tell the Controller to "Learn" on the first cycle press **HOME, 3** to go to the "**Utility**" menu (fig. 23) and then press **3** to toggle the **Learn** mode from "Off" to "On". Press **HOME** to return to the Home screen.

Save the Job

You should now save the job so that you don't lose job parameters if you turn off your machine or lose power. ***The S-4 does not automatically save your job parameters!*** To do this simply press **HOME, 2, 4** (fig. 24.) This will save all of the current Job parameters so that the next time you load this job from the Controller's memory, it will operate just as it did the last time you saved the job. We recommend that you save your Job anytime you make a change to it.

Tare the Scale

With nothing on the Scale, press **HOME, 1** to tare or zero out the Scale. After doing this, the display should read "0.000" (fig. 13). This removes any offset in the scale so that anything you now put on the scale will be weighed from a value of zero.

Note that, due to the sensitivity of our weighing equipment, you may find that a breeze or vibration from other machinery may cause a fluctuation of 0.001 or so.

Confirm Calibration of the Scale

Place a known weight on the Scale to check the accuracy. You should see the weight of your known weight displayed in the lower right hand corner of the display. From the factory the S-5 is calibrated in pounds. If you find that the Controller is not displaying the correct weight, or if you want to calibrate your machine in a different unit of measure, see page 12 for calibration instructions. If your S-5 is reading a negative weight or zero weight, see the Tips From The Experts section located at the end of this manual.

Press: HOME, 2, 1; then 8

Fig. 21: Drop Gate Open TIme edit screen

```
Drop Open Time
Current:    1.0
Input->
```

Press: HOME, 2, 1; then 9

Fig. 22: Drop Gate Close Time edit screen

```
Drop Close Delay
Current:    1.0
Input->
```

Press: HOME, 3; then 3 to toggle mode

Fig. 23: Utility screen with Learn mode toggled to "On"

```
1.Calibrate
2.Empty Hopper
3.Learn is On
4.Manual Dump
```

Press: HOME, 2, 4

Fig. 24: Setup screen showing "Save This Job" command

```
1.Edit This Job
2.Edit Modes
3.Load Job
4.Save This Job
```

> **!** **Be sure to Save your Job! The S-4 will not do it for you!**

Press: HOME, 1

Fig. 25: Home screen indicating that scale has been tared to zero

```
1.Tare
2.Setup
3.Utilities
Job:2Au   0.000
```

Adjust the Supply Hopper Gate

Adjust the Supply Hopper Gate to a height such that you have the shallowest consistent flow possible. This will give you the greatest control over the flow of product into your container. You may have to adjust this later on.

Put Some Product in the Supply Hopper

Put your product in the Supply Hopper. It should flow down into the Feed Pan/Vibrator. We recommend filling the Supply Hopper at least half way.

Press the Footswitch

Press the footswitch to start the fill cycle. The Drop Gate will open and close and the vibrator will start. If you have the optional Dribble Feed Gate, it will open. The Logical Controller II will slowly increase power to the vibrator as it "learns" how to most efficiently and effectively execute a fill cycle. When the Weigh Hopper has been filled the screen will indicate the job is done and display the weight in the Weigh Hopper. Press the footswitch again to dump the product and begin another cycle. You will notice that the second cycle runs much more quickly than the first.

Fine Tuning

If you find the vibrator is running very fast and/or it takes a long time for the Weigh Hopper to fill, the Supply Hopper Gate may be restricting the product in the Supply Hopper. On the other hand, if the Weigh Hopper fills quickly and is not very accurate, the Supply Hopper Gate may not be restrictive enough and should be lowered. Generally the Feed Pan should contain one layer of product when the Weigh Hopper is filling. For example, if you are filling a container with beans, you should observe a continuous flow of beans in the Feed Pan, one bean deep that flows smoothly and evenly. If there are gaps or open spots where you can see the bottom of the Feed Pan, you should raise the Supply Hopper Gate. There are two gate sizes included with the machine to allow for more adjustability. For more helpful hints on getting the most out of your S-4 see the "Tips from the Experts" section.

Re-entering the Learn Cycle

If you make a major adjustment to the Supply Hopper Gate, you should begin a new "Learn Cycle". To do this, simply press **HOME**, **3**, **3** to toggle the Learn Cycle on. You can usually make small adjustments to the Supply Hopper Gate without re-entering the Learn Cycle.

Save the Job

You should now save the job so that you don't lose job parameters if you turn off the machine or lose power. ***The S-4 does not automatically save your job parameters!*** To do this simply press **HOME, 2, 4** (fig. 15.) This will save all of the current Job parameters so that the next time you load this job from the Logical Controller II's memory, it will operate just as it did the last time you saved the job. We recommend that you save your Job anytime you make a change to it.

Supply Hopper Gate

Feed Pan

Be sure to re-enter the Learn Cycle if you make major adjustments to the Supply Hopper Gate!

Be sure to Save your Job! The S-4 will not do it for you!

Calibrating Your S-4

Calibrating your new S-4 is a very important step that will ensure that the Logical Controller II can accurately weigh your product. Calibration is the process that gives the Controller a weight reference point. For example, if you use a one pound weight (recommended), the Controller will know what a pound "feels like" and will use that reference to calculate all other weights. We recommend that you recalibrate your S-4 at one month intervals or when you find that you're not getting accurate product fills.

Calibration is a system parameter and not a job parameter. You do not have to recalibrate when changing jobs.

Please use the following procedure to calibrate your S-4.

Tare the Scale

With nothing on/in the scale/Weigh Hopper, press **HOME, 1** to tare or zero out the scale. After doing this, the weight display should read "0.000" (fig. 26). Note that, due to the sensitivity of our weighing equipment, you may find that a breeze or vibration from other machinery may cause a fluctuation of 0.001 or so.

Put a Known Weight* on the Scale

Place a known weight on/in the Weigh Hopper and check accuracy. If your S-4 does not accurately display your weight, you may need to recalibrate your scale. To calibrate the scale, first tare the scale (see above), then put an object of known weight on/in the Weigh Hopper. Press **HOME, 3, 1** to get to the calibration screen. You will be prompted to input the weight of the object you placed on/in the Weight Hopper (fig. 27). Input the weight of the object and press **ENTER**. You will be returned to the main screen where you should see the correct weight of the object on/in the Weigh Hopper.

*What's a "known weight"? A known weight can be any object—a book, a shoe, your watch—as long as you know how much it weighs. The Controller uses this weight as a base reference for calibration. The accuracy of the S-4 depends on how accurate your known weight is. The S-4 will be much more accurate in its measurements if your calibration weight is known within a few thousandths of a pound.

To set the S-4 to use metric weights, simply use a known weight of metric value to calibrate on/in the Weigh Hopper. In other words, if you have a calibration weight of 1.000 kilogram (exactly!) then place that on the scale during calibration (see section above) and input "1.000" as the calibration value. The weight reading on the scale is now in kilograms.

Fig. 26: Home screen indicating that scale has been tared to zero

```
1.Tare
2.Setup
3.Utilities
Job:1Us    0.000
```

Fig. 27: Calibration screen showing 1.000 lbs input as a calibration value

```
Input Cal Weight
Input -> 1.000
ENTER to Confirm
HOME to Escape
```

Technical Support

Logical Machines is dedicated to supporting its customers. If you have any questions concerning the operation of the S-4, please don't hesitate to contact us!

On the web: www.logicalmachines.com

Via email: support@logicalmachines.com

By phone: 802.425.5360

Glossary of Controller Terms

Home Screen: This is the main menu that is displayed when you power-up your machine. Any time your controller is powered on you can press the Home button and be brought to this screen. All of the menu items in the controller can be accessed from this screen.

Home button: This button will bring you back to the home screen at any time. This includes when a cycle is running. This is helpful if you need to stop the machine at any time, or if you are lost in the menus and need to get back to the home screen.

Tare: Pressing **1** on the home screen will tare the machine. This provides the zero location for the weight the controller displays. With an empty weigh hopper, if you don't see 0.000 in the lower right hand corner of the display on the home screen, you can press the tare button to zero the machine.

C-CE button: This button will clear your entry if you make a mistake while inputting job parameters.

Enter button: This button is used to confirm an entry when inputting job parameters.

Up and down arrows: These buttons are used to navigate menus that have multiple screens. For example the "Edit this Job" menu and the "Edit Modes" menu.

Setup Menu: This menu allows you to access job parameters and modes. It also allows you to load a job and save your current job.

Edit This Job Menu (Edit Job): This menu contains all the job parameters that control how your fill cycle runs.

> **Bulk Cutoff Weight (Blk Cut):** unit of measure: weight. The controller fills the weigh hopper at the Bulk Motor Speed (high speed) until it reaches the Bulk Cutoff Weight. At this weight the controller switches into the dribble feed portion of the cycle.

> **Bulk Motor Speed (Blk Spd):** unit of measure: percentage (0-99). Speed at which the vibrating feeder runs during the bulk feed portion of the cycle.

> **Dribble Cutoff Weight (Drib Cut):** unit of measure: weight. This is the weight at which the controller stops the dribble feed portion of the cycle and evaluates to see if the cycle has reached the target weight.

> **Dribble Motor Speed (Drib Spd):** unit of measure: percentage (0-99). Speed at which the vibrating feeder runs during the dribble feed portion of the cycle.

> **Target Weight (Target):** unit of measure: weight. This is the fill weight you are trying to achieve.

> **Check High (Chk Hi):** unit of measure: weight. The Check High and Check Low control the red and green status lights on the front of the controller. They do not affect how the job runs. They are a visual indicator to the operator that the weight in the weigh hopper is within an acceptable range.

The Check Hi is the upper end of this range. This is the weight at which the light goes from green to red, to indicate to the operator that there is too much product in the weigh hopper.

Check Low (Chk Lo): unit of measure: weight. The red light will turn off and the green light will turn on when the Check Low weight is reached. Because your machine is designed to never be underweight we recommend setting the Check Low at the same weight as your Target Weight. The green light will only illuminate when the weight is between the Check Lo and Check Hi, otherwise the red light will be illuminated alerting the operator that the fill is not within your predetermined range.

Drop Gate Open Time (DropOp): unit of measure: time (in seconds). This is the amount of time that the drop gate is open. When you load a new job this setting is preset at 1.0 seconds. This is typically a good place to start for this setting and it can be optimized to improve cycle time.

Drop Gate Close Time (DropCl): unit of measure: time (in seconds). This is the amount of time between when the Drop Gate is told to close and the feed resumes. When you load a new job this setting is preset at 1.0 seconds. This is typically a good place to start for this setting and it can be optimized to improve cycle time.

Dribble Delay Time (Drib Dly): unit of measure: time (in seconds). This is an optional setting that is only displayed when the Dribble Gate is enabled. This delay pauses the feed while the Dribble Gate closes. This is used if when the gate closes it pinches product between the Dribble Gate and the Feed Pan, or if it knocks product out of the machine.

Edit Modes Menu: The Edit Modes menu allows the operator to adjust other features depending on application and configuration of your machine.

> **Mode (Mode):** toggle User or Auto. In User Mode all of the job parameters are controlled by the operator. In Automatic mode the controller adjusts the bulk and dribble parameters to what it thinks will make the job run the best. Note that there is a difference between User/Auto mode and Auto Dump.

> **Auto Dump (AutoDump):** toggle on or off. With Auto Dump off the controller requires the footswitch to be pressed to start and dump every cycle. With Auto Dump on the controller requires the footswitch to be pressed to start the first cycle and it will dump the weigh hopper each time it reaches weight until the machine is paused or sent back to the home screen.

> **Auto Tare (AutoTare):** toggle on or off. When toggled on the controller will prompt you first for cycles per tare. This is the number of cycles between each auto tare. This can be set from 1 to 255. After inputting the cycles per tare, the tare pause delay

time will be prompted. This is adjustable between 0.01 and 2.55 seconds. For the most accurate auto tare it is best to use 2 seconds or more. The purpose of the tare pause delay is to allow the system to settle before the auto tare.

Settle Time (Settle): unit of measure: time (in seconds). The settle time serves two purposes. First, it is the amount of time the Controller evaluates the final weight. It is also the minimum amount of time that the controller is in the dribble part of the cycle. See "Tips from the Expert's" section for more detail.

Machine software selection (Machine): This option selects which machine parameters your Logical Controller II is setup to use. This should be set to S-4. If this changes press **5** to select this setting, **4** to select S-4 and press **ENTER** to confirm.

Dribble Gate Enable (DribGate): Toggle on/off. This option enables and disables the Dribble Gate for machines equipped with a Dribble Gate. With the Dribble Gate off, the Dribble Gate will stay open (if equipped). With the Dribble Gate enabled the Dribble Gate will open before the bulk portion of the cycle and close before the dribble portion. Enabling the Dribble Gate activates the dribble delay (option O in Edit this job) as described above.

Bagger enable (Bagger): Toggle on/off. This option turns on the output signal for a bagging machine, and changes the way the footswitch signal is handled by the controller. If you are integrating your machine with a bagging machine or conveyor, please contact Logical Machines directly for more information.

Load Job: This allows you to load either a previously saved job or load an unused job to create a new job. On this screen you will input the job number you want to load and press **ENTER** to confirm that number and load the job. You must load a new job before setting up a new job. If you accidentally make changes to an existing job and save the job you will lose your old settings.

Save This Job: Selecting Save This Job will save the current job parameters as the current job number. There is no "save as" option with the Logical Controller II.

Utilities Menu: This menu contains functions that the operator might find useful when setting up and running the machine.

Calibrate: This allows the operator to calibrate the machine. See page 4 for further information.

Empty Hopper: This function opens the Weigh Hopper Drop Gate, if equipped the Dribble Gate will open and runs the vibrating feeder at full power. To stop this function hit the footswitch or any button on the keypad.

Learn: This function must be turned on for the initial cycle when using Auto Mode. This is explained in more detail on page 10 in the Automatic Mode section.

Manual dump: This function opens the Weigh Hopper Drop Gate to dump the product in the Weigh Hopper. The Controller closes the Drop Gate after the dump is complete.

Other features within the controller:

Pause: While a cycle is running the footswitch or any key on the controller (except for the **HOME** button) can be pressed to pause or subsequently resume the cycle. Pressing the **HOME** button during the cycle will bring the controller back to the home screen.

Bump: The Controller will "bump" when the weight in the Weigh Hopper is above the Dribble Cutoff weight but below the target weight. The purpose of the bump is to feed the last little bit of product into the Weigh Hopper for the cycle to reach the target weight. Ideally your job should be set up so this happens at most once every 10 cycles.

Tips from the Experts

Here are a few tips that will help as you set up your S-4 and begin to understand how all the parameters work together:

- **Only adjust one setting at a time.** This will allow you to see how the machine responds to a change in a specific parameter. Each time a setting is changed, especially Bulk and Dribble Speeds, run a couple cycles to allow the machine to respond to the change.

- **Your machine only weighs product that is in the weigh hopper.** When the Controller instructs the vibrator to stop feeding product, the weight will increase a little because the product that has left the end of the feed pan has not hit the surface of product in the Weigh Hopper.

- **When setting up your job, especially when first learning the machine, it is important to start low and slow.** This means to start with lower cutoff weights and motor speeds. Because of this, your first cycle might take 30 seconds to fill a pound of coffee. The first thing to focus on with your job is to hit your target weight. Adjust the Dribble Cutoff a little below the target weight to accomodate for the small amount of product that has left the feed pan but has not been weighed. This is a balance between the Dribble Cutoff and Dribble Speed.

  If you find that the machine "bumps" (a quick, short vibration of the feed pan) every cycle, that suggests that your Dribble Cutoff weight is too low. The Controller is bumping because the current weight in the Weigh Hopper is below the target weight but above the Dribble Cutoff weight. The Controller will bump to move a small amount of product into the Weigh Hopper and then evaluate the final weight. It will repeat this process until the machine reaches the target weight. For best efficiency you want the job set up so that it does not bump.

- **If you find that the machine is overshooting every cycle and the Controller is in the dribble part of the cycle for at least 2 seconds, then most likely your Dribble Cutoff is too high.** If lowering the Dribble Cutoff weight does not help the overshooting then it is most likely that your bulk settings are too aggressive.

Settle Time explained:

Settle Time has two functions inside the Logical Controller II. First, it is the amount of time that the Controller takes to evaluate the final weight at the end of the cycle. This allows the product to settle for a brief period before the final weight is determined. 1.0 seconds it typically a good Settle Time. It also sets the minimum amount of time the machine is in the dribble part of the cycle. Here's why: With some speeds and products there may be residual vibration in the machine during the transition from bulk to dribble. This vibration can cause a very brief spike in the weight read by the Controller. In very specific instances, this can cause the weight the Controller observes to be above the Dribble Cutoff even though there is not that weight of product in the Weigh Hopper. By forcing the machine to dribble for 1.0 seconds, the effects of a spike in weight are mitigated for the duration of the Settle Time.

If you have your settle time set high—for example 2.5 seconds— you can force the machine to overshoot. This is because the machine waits for the 2.5 second timer to expire before the Controller recognizes that it has passed not only the dribble cutoff weight, but the target weight as well. For most weights and products a settle time of 1.0 seconds is appropriate.

Miscellaneous Tips:

- **Is the drop gate not opening on your S-4?** If so, you may have accidently switched the Controller over to software for another machine. The first thing to check is to see if your Drop Open Delay and Drop Close Delay are still visible in the 'Edit this Job' menu. These are options 8 and 9 in this menu. If these items are set to zero, the drop gate will not open. If these items are missing you can go to the Setup Menu and then the Edit Modes menu. Arrow down to option number 5 (machine type). Confirm that this says "S4". If it does not, press **5** to select the Machine Type, then press **4** to select S4. Press **ENTER** to confirm. This will return you to the Edit Modes menu.

- **At any point in time the HOME button can be pressed to bring the Controller back to the Home Screen.** This is helpful if you get lost in a menu or the machine is running a cycle and you want to get back to the Home Screen. Pressing the **HOME** button will stop the machine.

- **Is your machine not reading the proper weight? Does the weight not tare to zero? There are a few things that could cause this:**

  1. Travel locks (C-clamps) may not have been removed. These connect the Weigh Hopper and Discharge Funnel and are installed to secure the Weigh Hopper during shipping.

  2. The quick release cam lever for the Discharge Funnel/ Discharge Chute must not be pointed upward as it may interfere with the Weigh Hopper which will cause inaccurate weights. The lever must be pointed downward to prevent any interference with the Weigh Hopper.

  3. The Load Cell could be damaged. The Load Cell is the aluminum block with a dog-bone shape cut out of the center. There are two ways to check this. To test for electrical damage, tare the Controller, shut the Controller off and then turn it back on. If the Controller reads a number like -6.191 or -3.714 or some other negative number this suggests that the Load Cell is damaged. To test for mechanical damage, take a penny and put it underneath the end of the Load Cell (the end where the Weigh Hopper mounts). The penny should have a snug fit. If it either doesn't fit or it has a lot of wiggle room, the Load Cell may be damaged.

4. The screws that fasten either the Load Cell to the chassis or that attach the Weigh Hopper to the Load Cell may have loosened. If the Load Cell is loose it cannot work properly. The screws for the Load Cell can be tightened using a 10mm socket. Torque should not exceed 6 ft-lbs.

• **Extending the length of your AutoDump cycle:** If you want to run your machine with AutoDump enabled but your cycle is running too quickly you can add time to your cycle with the Drop Close delay setting. This is option 9 in the 'Edit This Job' menu. Increasing the Drop Close delay time will add a time delay between the Weigh Hopper door closing and the vibratory feed resuming. It may sound counterintuitive to increase the cycle time on a semi-automatic weigh fill machine, but it can be helpful when the operator needs additional time to prep a new container to fill.

• **A quick way to empty your weigh hopper without running a cycle:** You can empty the Weigh Hopper without running a cycle or going to the Utilities menu. Follow the small air lines that attach to the weigh hopper to the solenoid underneath the vibrating feeder. On the bottom of the solenoids there is a small red button. Pressing this button will manually actuate the solenoid and open the Weigh Hopper Drop Gate. For machines equipped with a Dribble Gate, the solenoid to actuate is the one closest to the regulator.

Washing Guide

We've created this short Washing Guide to help you keep your Logical Machines Weigh Filler in good working order. It's important to keep your machine clean so that maximum speed and accuracy can be maintained.

Please Note: Due to slight variations within the Logical Machines model line, the cleaning process may differ slightly.

1. Remove the Supply Hopper by lifting it off the rubber mounts on the chassis (fig. 1).
   - If the nuts were not taken off during initial set up, they may need to be removed. There are (4) 1/4-20 jam nuts that hold the Supply Hopper on during shipping. Use a 7/16" wrench to remove these if necessary.
   - In figure 1, the supply hopper gate has already been removed.

2. Removing the Supply Hopper will expose the Feed Pan (fig. 2).

> **!** Assure that the machine is unplugged from air and electrical sources before washing and that special care is taken with the electrical components during the cleaning process.
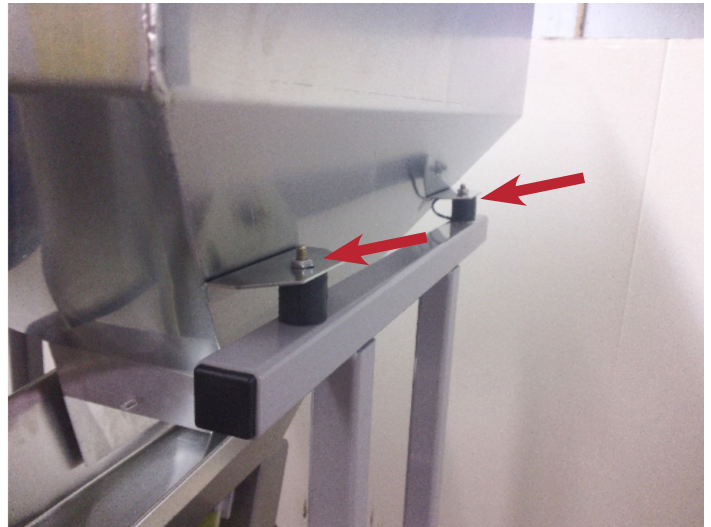

Fig. 1: Nuts holding Supply Hopper to rubber mounts

Fig. 2: Feed Pan exposed after removing Supply Hopper

3. The Feed Pan may be cleaned in the mounted position or be removed for a more thorough cleaning.

- To remove the Feed Pan, remove (4) bolts fastening the Feed Pan to vibrator with a 1/2" wrench. (Fig. 3)
- Remove feed pan and submerge for most thorough cleaning.

The Feed Pan will tip forward as these screws are removed and will fall if not held during this process.

Fig. 3: (4) 5/16-18 bolts hold the Feed Pan to the Vibrator.

4. Remove the Discharge Spout (if applicable) from the Discharge Funnel by unscrewing the (2) rosette head thumb screws. (Fig. 4)
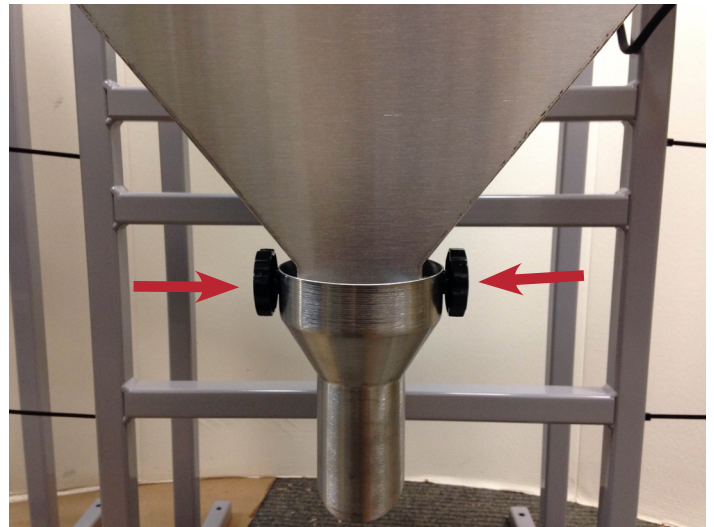

Fig. 4: (2) rosette-head thumb screws holding the Spout

5. Remove the Discharge Chute or Funnel by opening the quick-release cam lever, tilting the top of the Chute or Funnel forward, and lifting gently. (Fig. 5)
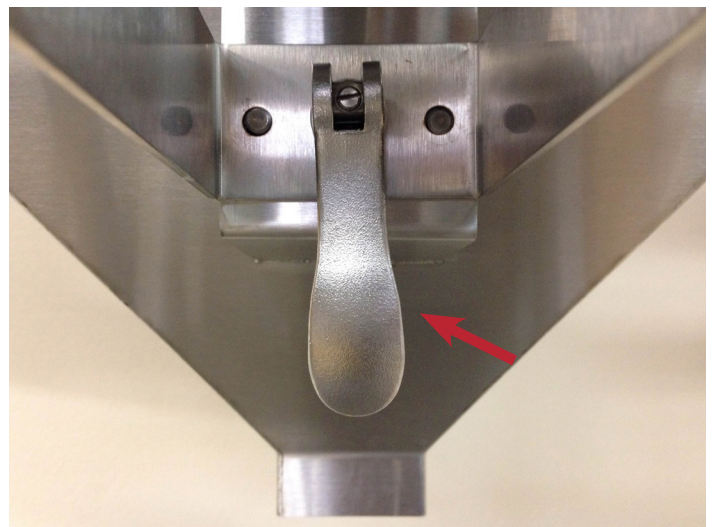

Fig. 5: The quick-release cam

6. Remove the Weigh Hopper assembly for easier cleaning. This is easier without the Feed Pan in place.

    A. Remove the (2) air hoses that run from the flow controllers to the solenoid. These air hoses can be attached rather firmly, so the easiest method is usually to unscrew the (2) 1⁄4" brass barbs that protrude into the hoses. (Fig. 6)

    B. Note that the air hose coming from the bottom of the solenoid goes to the lower end of the air cylinder. It's a good idea to mark the hoses so that you'll know how to reattach them.

    C. Pull the black cable tie out of the chassis so that the air hoses hang freely. (Fig. 7)

    D. After unscrewing the barbs, the (2) 10mm screws that hold the Weigh Hopper to the load cell must be removed. Make sure to support the Weigh Hopper during this process or it may fall. (Fig. 8)

    E. Now that all pieces have been taken off, clean as necessary.

7. Reassemble in reverse order.

    Notes regarding reassembly:

    • Air hoses must be routed to the correct barbs for proper functionality

    • This hose from the top of the air cylinder goes to the top of the solenoid. (Refer to fig. 6 for proper routing.)
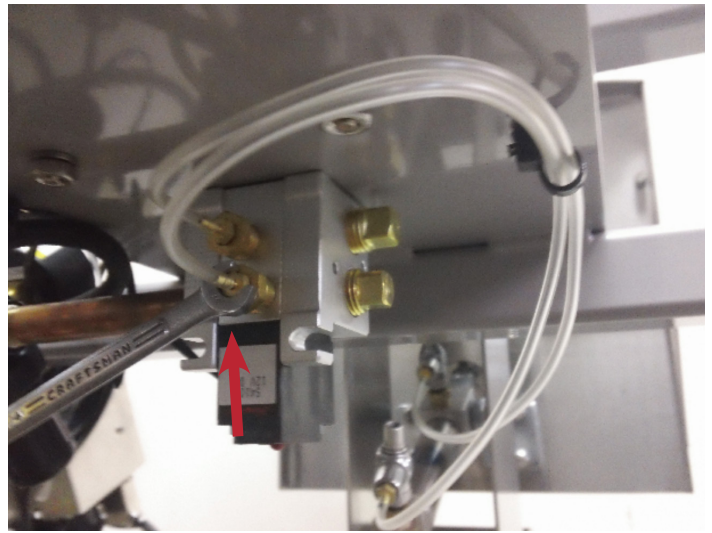

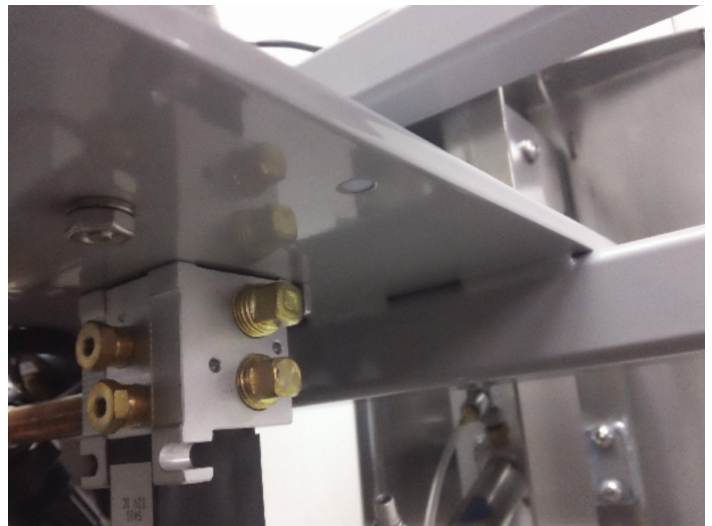Fig. 6: Unscrewing the brass barbs holding the hoses to the solenoid

Fig. 7: Solenoid and chassis without air hoses attached

Make sure to hold the Weigh Hopper so that it does not fall while removing the two bolts!

Fig. 8: Removing the two 10mm bolts holding the Weigh Hopper

LOGICAL MACHINES JOB LOG

JOB #	Product	Weight	Container	SPECIAL NOTES
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

LOGICAL MACHINES SETTINGS LOG

PRODUCT NAME [   ] JOB NUMBER [   ]

1	BLK CUT						
2	BLK SPD						
3	DRIB CUT						
4	DRIB SPD						
5	TARGET						
6	CHK HI						
7	CHK LO						
8	DROP OP						
9	DROP CL						

NOTES:

Make a few copies of this form (one for each new job)

LOGICAL MACHINES

WARRANTY

Logical Machines expressly warrants to its buyers, for **ONE YEAR** from date of purchase, that the goods sold will be free from defects in both workmanship and material when used under normal operating conditions. At its option, Logical Machines will repair or replace, without charge to the buyer, any goods which its finds to be defective provided that Logical Machines has been notified by the buyer of the defect prior to the termination of the warranty period. And also that the goods are shipped to Logical Machines with prior authorization with all shipping cost being at the expense of the buyer.