

## 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 material from a Supply hopper. It can be used in an **Automatic** mode where the S-4 controller tries to determine the operating parameters or in a **Manual** or **User** mode where the operator supplies the operating parameters.

In the **Automatic** mode the operator simply tells the S-4 how much material he/she would like in the container, puts a container under the funnel, and presses the footswitch. The S-4 will automatically "learn" how to fill the container optimizing for accuracy and speed.

The S-4 can also be used in a **User** mode where the operator can manually enter all of the machine parameters. This is usually used for difficult or unusual materials.

### Unpacking & Assembling Your New S-4

You must do a small amount of setup when unpacking and assembling your S-4 for the first time.

#### Remove packing material

- Install the 4 casters on the bottom of the machine.

#### Remove the travel lock.

- This is a C-clamp on the left side of the discharge funnel.
- Machines with large hoppers will have one on each side.

#### Reposition the controller box.

- Unbolt the controller from it's traveling position. Using the same nut and bolt mount it on the right front vertical part of the chassis using the .25" hole. The controller should be mounted to the outside of the chassis.

#### Attach compressed air supply.

- Regulator is factory preset to 20psi.

#### Plug in the controller.

- Plug the power cord into a 120V outlet



# Getting to know the S-4

## Supply Hopper

This large stainless steel hopper is where you will put your bulk material.

## Supply Hopper Gate

This is a small gate located on the Supply Hopper that controls how fast the material should flow from the Supply Hopper onto the Feed Pan.

## Feed Pan/Vibrator assembly

The bulk material flows down from the Supply Hopper onto the Feed Pan. The Feed Pan is attached to a vibrator.

## Optional Dribble Gate

The purpose of the optional dribble gate is to restrict the flow of material during the dribble cycle.

## Weigh Hopper

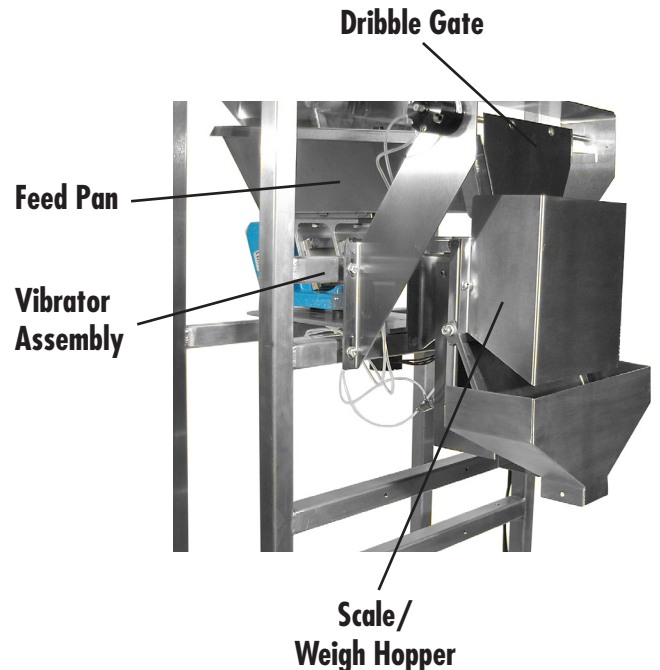
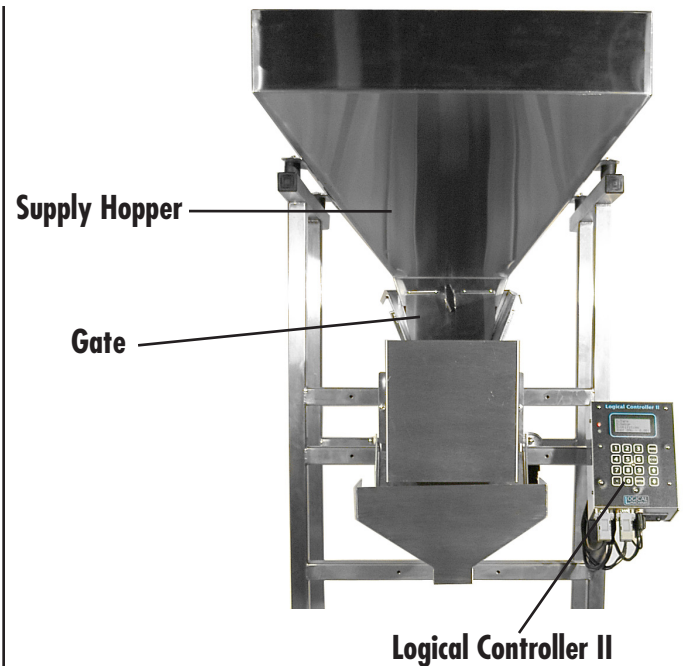
This is where the material accumulates and is weighed during a fill cycle. Once this is filled to the desired weight, it is dropped into the container by the controller using the drop gate.

## Logical Controller II

The Logical Controller II is the "brain" of the S-4. It contains a small computer that controls the speed of the vibrator motor and interfaces with the operator through the footswitch, front panel switches and front panel LCD screen.

## Footswitch

The footswitch will normally sit on the floor. The footswitch is used by the operator to start and stop the S-4. 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

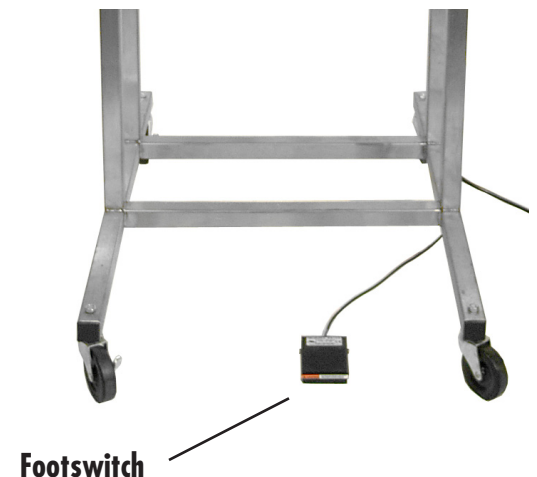
The power switch is located on the bottom of the Controller.

## LCD Screen

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

## Keypad

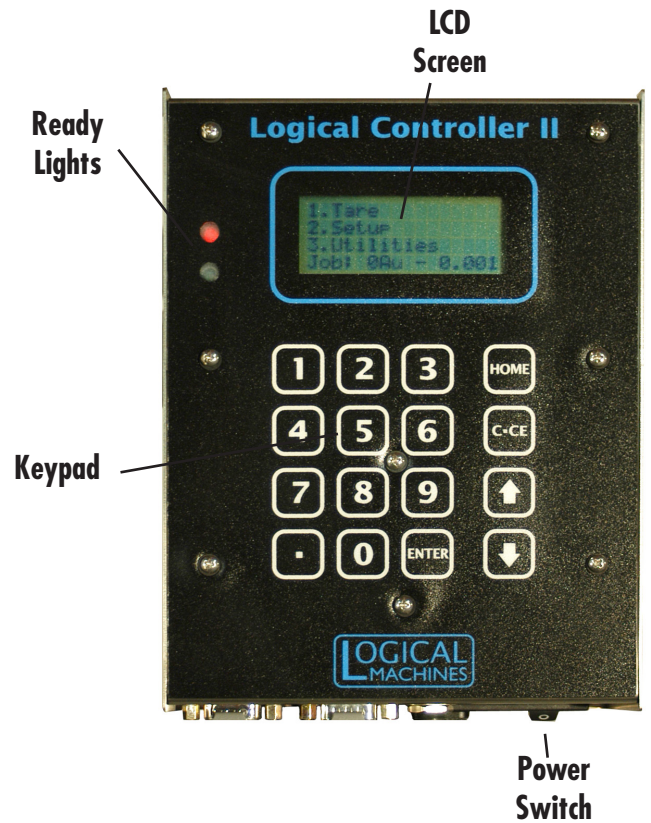
The Keypad has 16 keys and is used by the operator to communicate with the Controller. The keys "0" thru "9", ".", and "Enter" keys are used to make menu selections and to enter values. The "C/CE" key is used to clear an erroneously entered value while entering a new parameter. The up and down arrow keys are used for scrolling through menus or data. The "Home" key takes you back to the main menu from any screen. This last key keeps



you from getting lost in the menus. It also allows easier communications for our telephone technical support. For example, no matter what screen you are in, 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. 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 it to see if it is blown. Replace it with a fuse of the correct value (4 amps).



# Controller Menu Tree

## Home Screen

- 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 material*)
    - 6. Check Hi (*adjusts weight at which green ready light turns off*)
    - 7. Check Lo (*adjusts weight at which green ready light turns on*)
    - 8. DropOp (*adjusts amount of time weigh hopper door stays open*)
    - 9. DropCl (*adjusts amount of time between weigh hopper door closing and start of next fill cycle*)
  - 2. Edit Mode
    - 1. Mode (*use button #1 to toggle between User and Auto modes*)
    - 2. AutoDump (*use button #2 to toggle On/Off*)
    - 3. AutoTare (*use button #3 to toggle On/Off*)
    - 4. Settle Time (*enter time: 0.01-2.5 seconds. See page 5 for details on Settle Time*)
  - 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 is On/Off (*use #3 key to toggle between Learn on/off*)
  - 4. Manual Dump (*empty weigh hopper*)

# Operating your S-4 in User (Manual) Mode

There are times when the material in the Supply Hopper does not lend itself very well to the **Automatic** mode of operation. Materials that are “sticky” or inconsistent can “fool” the controller in the Automatic mode. These materials usually run better in the **User** mode. When using the Logical Controller II in this mode, the operator must enter all of the operating parameters using the target weight up and down arrow switches.

## The Fill Process

The S-4 Logical Controller II in User mode fills a container as follows. It fills the major portion of the container at a high speed (Bulk Speed) until it reaches a certain weight (Bulk Cutoff). It then fills the remainder of the container at a slower speed (Dribble Speed) until it reaches a terminal weight (Dribble Cutoff). The terminal weight is usually a bit less than the final weight because a small amount of material falls into the container after the vibrator motor turns off.

For example, if the operator was filling bags with 5 pounds of rice, he/she 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 50% of full motor speed. The remaining 0.25 pounds of material might then get filled at a lower vibrator motor speed. The operator might program a Dribble Speed of 20% and a Dribble Cutoff of 4.98 pounds guessing that the final 0.02 pounds will fall into the container 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 using the power switch, the LCD screen displays a short “splash” screen (fig. 1) that indicates the model number and revision number. You should see a line like “S4 Rev 1.14”. In this example, the first part of the message “S4” would tell you that the Controller is setup for the Model S-4 machine. If this first part shows “S3” or “S5”, call Logical Machines for instructions on changing it to “S4”. The “Rev 1.14” part of the message is indicating the software revision in the Controller (1.14 in this example). Write this down so that if you need to call Logical Machines with a question, they will know what machine you have.

Once the “splash” screen has past, the Home screen (fig. 2) will show a short menu, a “Job number”, an indication of whether the current job is Automatic or Manual, and the weight indicated by the scale.

The “Job number” is the job currently being used. The Controller can store several jobs that the operator has setup and saved in its internal memory and the operator can recall those jobs later on. A Job is a set of parameters that tell the Controller how to fill a particular container with a particular amount of material. All jobs are saved 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”



**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 material in the feed pan to fall into the Scale/Weigh Hopper.

## Example Starting Parameters:

**Target weight ..... 1.00lb**

**Bulk Cutoff ..... 0.85lb**

**Bulk Speed ..... 60%**

**Dribble Cutoff ..... 0.98lb**

**Dribble Speed ..... 40%**

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

Fig. 1: Startup “splash” screen showing controller software version number

Logical Machines  
S4 Rev 1.14



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 adjustments.

The weight of the material currently in the Scale/Weigh Hopper will be shown on the bottom right side of the LCD screen. If you connected the scale you should be able to make this weight change by pressing on the Scale/Weigh Hopper.

## Load a Job

We will load job number 2 for this example. Load the current job number 2 from the controller's memory by pressing "Home, 2, 3" to get to the load job screen (fig. 3). You will be asked to enter the job number you want to load. Press "2" and then "Enter" to load the parameters currently saved in job #2. After hitting "Enter" you will be returned to the main screen. Notice that the bottom line of the display starts with "Job: 2" (fig. 4). This is telling you that job number 2 is being used.

## Setup Operating Modes

Now we need to tell the controller to use **User** mode for this job. This forces the controller to use operator supplied parameters while it is running. Press "Home, 2, 2" to get to the "Edit Modes" menu (fig. 5). The first item in this menu should be "Mode". Press "1" to toggle the mode from "Auto" to "User". Toggle the mode to indicate "User"

While you are in this menu, notice the other menu items. Press "2" to toggle the "AutoDump" setting to "Off". Press "3" to toggle the "AutoTare" to "Off". Press "4" to enter the Settle Time. This is the time given to the Controller to evaluate the final weight.

Once you have made the above changed to the 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 enter the Bulk Cutoff weight of 4.75 lbs. Press "Home, 2, 1" to get to the parameter edit list. Press "1" to edit the bulk cutoff weight (fig. 6). If you make a mistake while entering the parameter, press "C/CE" to clear your entry and reenter the parameter. Enter the desired bulk cutoff weight and press "Enter" when you are done. (Your Model S-4 comes calibrated in pounds. If you wish to change to the metric system, see the section on calibration , listed below.) You will be returned to the parameter edit list. You can use the arrow keys to view all of these parameters. Press "Home" to return to the home screen.

## Set the Bulk Speed

Press "Home, 2, 1" to get to the parameter edit list if you are not already in it. Press "2" to edit the Bulk Speed (fig. 7). If you make a mistake while entering the parameter, press "C/CE" to clear your entry and reenter the parameter. Enter the desired Bulk Speed and press "Enter" when you are done. (Both Bulk and Dribble speeds are displayed as a percent of 100%, full speed.) You will be returned to the parameter edit list. You can use the arrow keys to view all of these parameters. Press "Home" to return to the home screen.

Fig. 2: "Home" screen showing Job Number, Automatic or User modes, and weight of material currently on scale

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

Job Number

Mode Indicator

Current Weight

## Press: Home, 2, 3

Fig. 3: Load Job screen

```
Enter Job Number
Current:      0
Enter(0-99)->2
```

## Press: 2, Enter

Fig. 4: Home screen indicating Job 2 is current job number

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

## Press: Home, 2, 2; then press 1 to toggle mode

Fig. 5: Edit Modes screen with mode toggled to "User"

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

## Press: Home, 2, 1; then 1

Fig. 6: Bulk Cutoff weight edit screen. Enter value here

```
Bulk Cutoff
Current:00.000
Enter->
```

## Press: 2, 1; then 2

Fig. 7: Bulk Speed edit screen. Enter value here

```
Bulk Motor Speed
Current: 00
Enter->
```

## Set the Dribble Cutoff Weight

Press "Home, 2, 1" to get to the parameter edit list if you are not already in it. Press "3" to edit the Dribble Cutoff weight (fig 8). If you make a mistake while entering the parameter, press "C/CE" to clear your entry and reenter the parameter. Enter the desired Dribble Cutoff weight and press "Enter" when you are done. You will be returned to the parameter edit list. You can use the arrow keys to view all of these parameters. Press "Home" to return to the home screen.

## Set the Dribble Speed

Press "Home, 2, 1" to get to the parameter edit list if you are not already in it. Press "4" to edit the Dribble speed (fig. 9). If you make a mistake while entering the parameter, press "C/CE" to clear your entry and reenter the parameter. Enter the desired Dribble Speed and press "Enter" when you are done. You will be returned to the parameter edit list. You can use the arrow keys to view all of these parameters. Press "Home" to return to the home screen.

## Set the Target Weight

Press "Home, 2, 1" to get to the parameter edit list if you are not already in it. You can use the up and down arrow keys to view all the parameters. Press "5" to edit the Target Weight (fig. 10). If you make a mistake while entering the parameter, you can press the "C/CE" key to clear your entry and reenter the parameter. Enter the desired target weight and press "Enter" when you are done. You will be returned to the parameter edit list. You can use the arrow keys to view all of these parameters. Press "Home" to return to the home screen.

## Set Check Hi & Check Lo

Press "Home, 2, 1" to get to the parameter edit list if you are not already in it. 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).

## Set the Drop Gate Open Time

The Drop Gate Open Time is the time that the controller leaves the gate open. This and the Drop Gate Close Time can be adjusted to optimize cycle time. Press "Home, 2, 1" to get to the parameter edit list if you are not already in it. You can use the up and down arrow keys to view all the parameters. Press "8" to edit the Drop Gate Open Time (fig. 11). If you make a mistake while entering the parameter, you can press "C/CE" to clear your entry and reenter the parameter. Enter the desired open time and press "Enter" when you are done. You will be returned to the parameter edit list. You can use the arrow keys to view all of these parameters. Press "Home" to return to the home screen.

## Set the Drop Gate Close Time

Press "Home, 2, 1" to get to the parameter edit list if you are not already in it. You can use the up and down arrow keys to view all the parameters. Press "9" to edit the Drop Gate Close Time (fig. 12). If you make a mistake while entering the parameter, press "C/CE" to clear your entry and reenter the parameter. Enter the desired close time and press "Enter" when you are done. You will be returned to the parameter edit list. You can use the arrow keys to view all of these parameters. Press "Home" to return to the home screen.

### Press: Home, 2, 1; then 3

Fig. 8: Dribble Cutoff edit screen. Enter value here

```
Dribble Cutoff
Current: 00.00
Enter->
```

### Press: Home, 2, 1; then 4

Fig. 9: Dribble Speed edit screen. Enter value here

```
Dribble Speed
Current: 00
Enter->
```

### Press: Home, 2, 1; then 5

Fig. 10: Target Weight edit screen. Enter value here

```
Target Weight
Current: 00.00
Enter->
```

### Press: Home, 2, 1; then 8

Fig. 11: Drop Open Delay edit screen

```
Drop Open Delay
Current: 25.5
Enter->
```

### Press: Home, 2, 1; then 9

Fig. 12: Drop Close Delay edit screen

```
Drop Close Delay
Current: 25.5
Enter->
```

## Tare the Scale

With nothing on the scale, press "Home, 1" (fig. 13). The display should read "0.000". This removes any offset in the scale so that anything you now put on the scale will be weighed from a value of zero.

## Check Calibration of the Scale

Place a known weight on the scale and see if it is accurate. If it is not, you must "calibrate the scale". To calibrate the scale, first tare the scale (see above), then put an object of known weight on the scale. Press "Home, 3, 1" to get to the Calibration screen (fig. 14). You will be prompted to enter the weight of the object you put on the scale. Enter the weight of the object and press "Enter". You will be returned to the main screen where you should see the correct weight for the object on the scale.

## Adjust the Supply Hopper Gate

Set the height of the Supply Hopper Gate to something that will restrict the material flowing from the Supply Hopper to the Feed Pan so that it will flow smoothly. You may have to adjust this later on.

## Put some material in the Supply Hopper

Put your material in the Supply Hopper. It should flow down into the Feed Pan/Vibrator. You may have to push some material down into the Feed Pan to get things started.

## 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 display will indicate the weight of the material in the Weigh Hopper.

## Fine Tuning

If you find the vibrator is running very fast and/or it takes a long time for the accumulator to fill, the Supply Hopper Gate may be too restrictive for the material in the Supply Hopper. On the other hand, if the container fills quickly but 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 material when the container 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.

## Save the Job

You should now save the job so that the next time you turn the machine on, all the current operating parameters are saved. **The S-4 does not automatically save jobs.** You must save the job. To do this simply press "Home, 2, 4" (fig. 15.) This will save all of the current parameters so that the next time you load this job from the controllers memory, it will operate just as it did the last time you saved the job.

## Press: Home, 1

Fig. 13: Home screen indicating that scale has been tared to zero

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

## Press: Home, 3, 1

Fig. 14: Calibration screen showing 1.00lbs entered as a calibration value

```
Enter Cal Weight
Enter-> 1.00
```

Supply  
Hopper  
Gate

Feed Pan

## 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
```



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

# Operating your S-4 in Automatic Mode

You are now ready to turn your S-4 on for the first time. We will first setup a new job filling 0.50 lb containers in **Automatic** mode. This mode lets the Logical Controller II adjust itself for optimum performance.

## Turn on the Logical Controller II

Every time the controller is turned on using the power switch, the LCD screen displays a short “splash” screen (fig. 16) that indicates the model number and revision number. You should see a line like “S4 Rev 1.14”. In this example, the first part of the message “S4” would tell you that the Logical Controller II is setup for the Model S-4 machine. If this first part shows “S3” or “S5”, call Logical Machines for instructions on changing it to “S4”. The “Rev 1.14” part of the message is indicating the software revision in the Controller (1.14 in this example). Write this down so that if you need to call Logical Machines with a question, they will know what machine you have.

Once the “splash” screen has past, the Home screen (fig. 17) will show a short menu, a “Job Number”, an indication of whether the current job is **Automatic** or **Manual**, and the weight indicated by the scale.

The “Job Number” is the job currently being used. The Controller can store several jobs that the operator has setup and saved in its internal memory and the operator can recall those jobs later on. A Job is a set of parameters that tell the Controller how to fill a particular container with a particular amount of material. All jobs are saved 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 adjustments.

The weight of the material currently in the Scale/Weigh Hopper will be shown on the bottom right side of the LCD screen. If you connected the scale you should be able to make this weight change by pressing on the Scale/Weigh Hopper.

## Load a Job

We will load job number 1 for this example. Load the current job number 1 from the Controller’s memory by pressing “Home, 2, 3” to get to the load job screen (fig. 18). You will be asked to enter the job number you want to load. Press “1” and then “Enter” to load the parameters currently saved in job number 1. After hitting “Enter” you will be returned to the Home screen (fig. 19). Notice that the bottom line of the display starts with “Job: 1”. This is telling you that job number 1 is being used.

Fig. 16: Startup “splash” screen showing controller software version number

```
Logical Machines  
S4 Rev 1.14
```

Fig. 17: “Home” screen showing Job Number, Automatic or User modes, and weight of material currently on scale

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

Job Number

Mode Indicator

Current Weight

## Press: Home, 2, 3

Fig. 18: Load Job screen

```
Enter Job Number  
Current: 0  
Enter(0-99)->
```

## Press: 1, Enter

Fig. 19: Home screen indicating Job 1 is current job number

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



## Setup Operating Modes

Now we need to tell the controller to use Automatic mode for this job. This allows the Controller to try and optimize the running parameters while it is running. Press "Home, 2, 2" to get to the "Edit Modes" menu (fig. 20). The first item in this menu should be "Mode". Press "1" to toggle the mode from "Auto" to "User". Toggle the mode to indicate "Auto"

While you are in this menu, notice the other menu items. Press "2" to toggle the "AutoDump" setting to "Off". Press "3" to toggle the "AutoTare" to "Off". Press "4" to enter the Settle Time. This is the time given to the Controller to evaluate the final weight.

Once you have made the above changed to the 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 only parameter we need to adjust is the target weight. Press "Home, 2, 1, 5" to get to the target weight entry screen (fig. 21). This will prompt you for a target weight. Enter "0.5" followed by the "Enter" key. You will now be returned to the run parameter screen which shows all of the operating parameters. Since we will be running in Automatic mode you will not have to change any of these other items. Use the arrow keys to view all of these parameters. Press "Home" to return to the home screen.

## Set the Drop Gate Open Time

The Drop Gate Open Time is the time that the controller leaves the gate open. This and the Drop Gate Close Time can be adjusted to optimize cycle time. Press "Home, 2, 1" to get to the parameter edit list if you are not already in it. You can use the up and down arrow keys to view all the parameters. Press "8" to edit the Drop Gate Open Time (fig. 22). If you make a mistake while entering the parameter, you can press "C/CE" to clear your entry and reenter the parameter. Enter the desired open time and press "Enter" when you are done. You will be returned to the parameter edit list. You can use the arrow keys to view all of these parameters. Press "Home" to return to the home screen.

## Set the Drop Gate Close Time

Press "Home, 2, 1" to get to the parameter edit list if you are not already in it. You can use the up and down arrow keys to view all the parameters. Press "9" to edit the Drop Gate Close Time (fig. 23). If you make a mistake while entering the parameter, press "C/CE" to clear your entry and reenter the parameter. Enter the desired close time and press "Enter" when you are done. You will be returned to the parameter edit list. You can use the arrow keys to view all of these parameters. Press "Home" to return to the home screen.

## 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 material 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 material and how it flows.

## Press: Home, 2, 2; then press 1 to toggle mode

Fig. 20: Edit Modes screen showing Mode, Auto Dump and Auto Tare settings

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

## Press: Home, 2, 1, 5

Fig. 21: Target Weight entry screen with "0.5" entered

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

## Press: Home, 2, 1; then 8

Fig. 22: Drop Open Delay edit screen

```
Drop Open Delay
Current: 25.5
Enter->
```

## Press: Home, 2, 1; then 9

Fig. 23: Drop Close Delay edit screen

```
Drop Close Delay
Current: 25.5
Enter->
```

To tell the Controller to “Learn” on the first cycle press “Home, 3” to go to the “Utility” screen (fig. 24) and then press “3” to toggle the learn mode from “Off” to “On”. Press “Home” to return to the home screen.

## Tare the Scale

With nothing on the Scale, press “Home, 1”. The display should read “0.000” (fig. 25). This removes any offset in the scale so that anything you now put on the scale will be weighed from a value of zero.

## Check Calibration of the Scale

Place a known weight on the scale and see if it is accurate. If it is not, you must “calibrate the scale”. To calibrate the scale, first tare the scale (see above), then put an object of known weight on the scale. Press “Home, 3, 1” to get to the Calibration screen (fig. 26). You will be prompted to enter the weight of the object you put on the scale. Enter the weight of the object and press “Enter”. You will be returned to the main screen where you should see the correct weight for the object on the scale.

## Adjust the Supply Hopper Gate

Set the height of the Supply Hopper Gate to something that will restrict the material flowing from the Supply Hopper to the Feed Pan so that it will flow smoothly. You may have to adjust this later on.

## Put some material in the Supply Hopper

Put your material in the Hopper. It should flow down into the Feed Pan/Vibrator. You may have to push some material down into the Feed Pan to get things started.

## 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 Controller will very slowly increase the power to the vibrator as it “learns” or tries to judge how to best fill this container with the given material. During the first cycle the Controller operates very slowly while it is trying to figure things out. When the container has been filled the display will indicate the weight of the material in the Weigh Hopper. You will notice that after the “Learn Cycle” each subsequent container will fill a bit more quickly. This is because the Controller is continuously trying to optimize the fill accuracy and speed.

## Fine Tuning

If you find the vibrator is running very fast and/or it takes a long time for the container to fill, the Supply Hopper Gate may be too restrictive for the material in the Supply Hopper. On the other hand, if the container fills quickly but 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 material when the container 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.

## Press: Home, 3; then 3 to toggle mode

Fig. 24: Utility screen with Learn mode toggled to “On”

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

## Press: Home, 1

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

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

## Press: Home, 3, 1

Fig. 26: Calibration screen showing 1.00lbs entered as a calibration value

```
Enter Cal Weight
Enter-> 1.00
```



## Re-entering the Learn Cycle

If you make a major adjustment to the Supply Hopper Gate, you should force the Controller to start the “Learn Cycle” from the beginning. 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

After operating several cycles, you should notice that the S-4 has figured out how to fill your containers quickly and accurately. You should now save the job so that the next time you turn the machine on, all the current operating parameters are saved. **The S-4 does not automatically save jobs.** You must save the job. To do this simply press “Home, 2, 4” (fig. 27.) This will save all of the current parameters so that the next time you load this job from the controllers memory, it will operate just as it did the last time you saved the job.



**Be sure to re-enter the Learn Cycle if you make major adjustments to the Supply Hopper Gate or Feed Pan angle!**

## Press: Home, 2, 4

*Fig. 27: 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!**

# Calibrating your S-4

## Tare the Scale

With nothing on the scale, press the “Home, 1” to tare or zero out the scale. After doing this, the display should read “0.000” (fig. 26).

## Put a known weight\* on the Scale

Place a known weight on the scale and see if it is accurate. If it is not, you must “calibrate the scale”. To calibrate the scale, first tare the scale (see above), then put an object of known weight on the scale. Press “Home, 3, 1” to get to the calibration screen. You will be prompted to enter the weight of the object you put on the scale (fig. 27). Enter the weight of the object and press “Enter”. You will be returned to the main screen where you should see the correct weight for the object on the scale.

**\*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 scale uses this weight as a base reference for calibration. The accuracy of the S-4 depends on how accurate your known weight is. If you know the weight of your known weight within a few thousandths of a pound, the S-4 will be much more accurate in its measurements!

## Setting the Scale to use Metric weight

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

# Technical Support

Cleveland Equipment 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.clevelandequipment.com](http://www.clevelandequipment.com)

**Via email:** [support@clevelandequipment.com](mailto:support@clevelandequipment.com)

**By phone:** 866.888.6327

Press: Home, 1

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

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

Press: Home, 3, 1

*Fig. 27: Calibration screen showing 1.00lbs entered as a calibration value*

```
Enter Cal Weight
Enter-> 1.000
```