

# Johnson Manual

## Preview

The weighing machine you have purchased is controlled by an electronic controller we call the FINGER, (fully integrated next generation electronic remote). It controls all electrical inputs & outputs. It controls any motor speeds that may apply. It also monitors and controls all digital weights.

The programming of the FINGER was done at our factory. However, modifications may need to be made at the time of start-up, or later for trouble shooting purposes.

Complete instructions to operate the entire machine and to program the FINGER are in this manual.

Read it. If you familiarize yourself with it you should not have any problems with start-up.

However, from time to time problems do occur with shipping or with the installation, which may cause problems at start-up. If you have any problems, and this manual does not help, feel free to call and we will be more than happy to walk through the system by telephone with you. It is always handy if you could have a portable phone at the machine, so you can be our eyes for us.

It will take you about 2 hours to study this manual, and then give it to someone else in the plant so they can study it as well. In the last 40 years we have found that the more knowledge everyone has of a particular machine, the better that machine will operate. Having said that, we have also found that the more people's hands are kept out of the controls, the better the system will operate. That is why the design of these controls, allow the operators to operate the machine, without ever needing to access the electronics, that should only be left up to you, and one or two other people.

We always recommend that a pad lock be placed on all the control boxes and panels.

Call and let us know how your new system is running.

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## Explanation of Front Panel of Control Pedestal

**Counter:** Advances one digit at the end of every cycle.

**Digital Display:** Displays the last recorded weighment. Switches to *full* when the scale is up to weight, but has not yet released the weighment. If the weighment is within tolerance, *full* will remain on the display until a signal is given to discharge. If the weighment is not in tolerance, the display will show either *hi* or *low*, meaning the weighment is either higher or lower than the tolerance desired. As soon as the weighment is released, its net weight will then be displayed until the next weighment is completed.

**Main Power switch:** When turned to the *off* position, electricity is still applied to the FINGER (electronic controller), but the scale will not cycle. There is a switch for scale #1 and for scale #2, if applicable.

**Manual Discharge push button:** Used to release a *full* weighment that is out of weight tolerance. When pressed, it will also stop an ongoing fill cycle. Example: If the weigh hopper is not up to weight, but the surge bin above was out of material to be weighed, pushing the *Manual Discharge* will close the cut-off gate, stop the feeder. This will end that incomplete cycle.

**Desired Weight rotary selector switch:** Should be positioned to the desired weight stamped onto the legend plate. The FINGER will read the switch position. The first position, far left, is column #4 in the FINGER flow chart.

**Change of Product push button:** When pushed, that signal goes to the FINGER telling it to do the following:

1. Reads the position of the *Desired Weight* selector switch. It will then look at the parameter settings. (Columns 4 through 8 in the flow chart). It will run one cycle using that CP Target Wt., to get the first weighment as close to the desired weight as possible.
2. After the first cycle, the FINGER will determine the bulk density of the product being weighed, then set the *initial speed* for all future cycles. This initial speed will be set to give the *fill time* that is set in Column #2. (if applicable)
3. After the first cycle, the FINGER will adjust the "Cut off Wt." (Columns 4-8), used to obtain the desired weight. As it *Auto Checks* it will adjust the *Cut off Wt* accordingly.

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## Your Programming

Once all of your programming is done at start-up, record these values for future use. The values already filled in ahead of time should not be changed.

This is a list of all programming inside of your FINGER that can be set by the FINGER key pad.

**Note:** Be sure to enter into this page, any changes made to your programming, after your machine is installed. Some of the factory settings may need to be changed at time of start up.

### Column #2

Average ..... 21  
 # of scales .....  
 Auto Zero ..... 13  
 Auto Check..... 3  
 Fill Time..... 3.0

### Column #3

Calibrate..... Manual  
 Cal. wt. #1 .....  
 Cal. wt. #2 ..... (if applicable)  
 Your raw #s with no weight applied was set to approximately .....  
 Your raw #s with the above Cal wt. applied was set to approximately .....

	Column #4	Column #5	Column #6	Column #7	Column #8
Desired wt.					
CP Target wt.					
Cut off wt. #1					
Cut off wt. #2					
Low wt. %					
High wt. %	4	4	4	4	4
Mtr. Factor	2	2	2	2	2
Initial Spd	100	100	100	100	100
Flow Shut Spd	50	50	50	50	50
Ending Spd	5	5	5	5	5
Hold time	1.0	1.0	1.0	1.0	1.0
Dump time	.5	.5	.1	.1	.5
Reset time	.5	.5	.1	.1	.5

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## Your Programming

### Column #9

Set State#1 .....	Ready
Set State #2 .....	Ready (if applicable)
Set Feed motor#1 .....	Off
Set Feed motor #2.....	Off (if applicable)
Set Feed valve#1 .....	Open
Set Feed valve#2 .....	Open (if applicable)
Set Hopper valve#1 .....	Closed
Set Hopper valve#2.....	Closed (if applicable)
Set Dump valve#1 .....	Closed
Set Dump valve#2.....	Closed (if applicable)

### Column #10

Printer.....	On
Baud Rate .....	9600
Parity .....	None
Data Bits.....	8
Stop Bits.....	1
Char/Line.....	24

### Column #11

There are no settings

### Column #12

Time Out= .....	Off
Foot Pedal=.....	On
Dec. Places= .....	1
AZero Time= .....	2
DsWt.Adjust= .....	.05
CK Wt. Range= .....	.05

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## Definition of FINGER Keys

**Menu:** (a) In manual Mode, advances the screen to the next column  
(b) In Auto Mode, it is used to move to the next menu

**Item:** Pressing one time will advance the screen to the next item of the current menu.

**Field:** Moves the cursor under a specific number. This brings the screen out of screen saver.

When you are in the program mode, if you wait too long without touching a key, *Hit any Key* will begin flashing, this is a screen saver. Pushing the *Field* key will bring you back to where you were.



- (a) Raises the value of a number
- (b) Switches mode from Manual to Auto
- (c) Changes a *state* from *off* to *on*



- (a) Lowers the value of a number
- (b) Switches mode from Auto to Manual
- (c) Changes a *state* from *on* to *off*

**Help:** Not used

**Print Last:** Not used

**Last 5:** Not used

**Stat 1:** Not used

**Stat 2:** Not used

**Set:** (a) While in Auto mode, used as a **zero** button. It is not necessary to use this key as a zero. The bagger will always auto-zero.  
(b) Used to initiate a command. Example: if a *state* is moved from *off* to *on*, it is necessary to push *set* for the software to recognize the change.

**Exec:** (a) If pressed while 

Johnson Brothers Mfg. Weighing System 4.0
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 is showing, it will erase all programming, including calibration. This key should be used for this purpose only after consulting Johnson & Sons Mfg., Inc.  
(b) If pressed while calibrating, it is used to initiate the command to calibrate.

**NOTE:** When the *Exec* key is pressed, it is extremely important not to hold it down for more than a “touch.” If the FINGER does not see the command, simply press it again. Holding it in for any length of time at all will lock up the FINGER. You will then have to cycle the electricity and start over.

# INSERT FINGER DRAWING and Flow-Chart

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## Definitions and Explanation of each Column of the FINGER Flow Chart

### Column #1

**Note:** While the system is in any of these menus, the scale can cycle. It is OK to “Menu” to each menu location while the scale is cycling.

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#### Set Operation Mode

##### Mode: AUTO

This shows the viewer that the FINGER is in the Run Mode.

---

**#1 Wt. 0.0 50.1**

**Ready 100 3.16**

- #1 -** The scale number being viewed. Only a duplex would have a scale #2. Pressing the *Item* key will put scale #2 on the display. Pressing *Item* will toggle between scale #1 & scale #2.
- 0.0 -** Displays the actual live weight, coming from the weigh assembly. This number will rise as weight increases in the weigh assembly.
- 50.1 -** Displays the last recorded weightment. It is the same number that is recorded on the digital display on front of the control pedestal.
- Ready-** Displays the current *state* of the FINGER. If the scale is up to weight, it will show *full*. During a cycle, it will go from *Ready* to *Proportional* to *Slow Fill* to *Full*. When that weightment is discharged, it will go back to *Ready*.
- 100 -** This is the *Initial Motor Speed*, determined by the FINGER that will be required to obtain the *Fill Time* desired. This is based on percentage. (If applicable)
- 3.16 -** This is the last recorded *Fill Time*. *Fill time* is the time required for the weigh assembly to get from 0.0 to *full*.

---

#### Set Material Type

##### Material # = 4

This is the position of the *Desired Weight* selector switch on the front of the control pedestal that the FINGER currently recognizes.

---

#### Weight Totals/Stats

##### Total Wt. #1= 0.0

This is the accumulated weight of all cycles since *Change of Product* was begun. Pushing *Change of Product* will clear it to 0.0. All cycles are accumulated except for the first two. Pressing the *Item* key will toggle between scale #1 & scale #2 of a duplex. It will not update while viewing. *Menu* to another menu, then back, and it will have updated. Pressing *Item* will also show *total cycles*, this will show the total cycles the system has run since installation. This number count is not able to be reset.

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## Column #2

### **Set Operation Mode**

#### **Mode = Manual**

The system is in the programming mode and will not cycle.

---

### **Set Operation Mode**

#### **Average # = 21**

This is the number of samplings the FINGER averages together to make a conclusion.

---

### **Set Operation Mode**

#### **# Scale = 1**

This is the number of individual scales the FINGER is recognizing. A duplex would be set to the number 2.

---

### **Set Operation Mode**

#### **Auto Zero = 13**

The first two cycles will always auto-zero, before the weighment begins. After the first two, this is the number of cycles it skips between auto-zeros. The start of the cycle pauses for two seconds when it auto-zeros.

---

### **Set Operation Mode**

#### **Auto Check = 3**

After the first two cycles, this is the number of cycles the system will run before it checks the average weight. If the average is not at the desired weight, it will adjust the "Cut off Wt." accordingly. It will raise the "Cut off Wt." 70%, or lower it 40%, at a time.

---

### **Set Operation Mode**

#### **Fill Time = 3.0**

This is the amount of time that is desired to bring the weigh assembly up to "Full" - the actual time that product is being fed to the weigh assembly.

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## Column #3

### **Calibrate Scale #1**

#### **Calibrate = Manual**

Because your system does not have *automatic calibration* assembly, it will always be necessary to leave it set to *Manual*. (Never set to *Automatic*)

---

### **Calibrate Scale #1**

#### **# of Dumps = 1**

This is the number of cycles the system will run with one *start* command.

Example: Set this value to 1. When the operator, or an external piece of equipment, gives the signal to discharge, or start, the system will run one cycle, and then wait for another signal. If the value had been set to 4, one signal to discharge, or start, would cause the scale to attempt to weigh up and discharge four times before waiting for additional operator action.

---

### **Calibrate Scale #1**

#### **Cal. Wt. = 50.000**

This value should be set according to the weight of the test weight you intend to use in the calibration of the scale.

---

### **Set Zero #1 Val. = 261**

#### **Press Exec to Set**

With the scale assembly clean, and with no vibration of any kind affecting the weigh assembly, press the execute key - *Exec* (do not hold down, press quickly and release). This will calibrate the *Zero*. The value for this location may not be 261 in your application. Any value between 120 and 450 is acceptable. This value represents the *Raw Data* coming from the load cells. The number should be steady, but may fluctuate 1 or 2 counts.

---

### **Calibrating Zero**

Calibration is in progress.

---

### **Set Max #1 Val. = 2740**

#### **Press Exec to Set**

Attach your test weight to the weigh assembly. With the weight applied, this number should be between 2200 and 3000. With nothing affecting the weigh assembly, and with this number steady (within 1 or 2 counts), press *Exec*. This will calibrate the high end.

---

### **Calibrating Max**

Calibration is in progress

---

### **Weight Display #1**

#### **# = 2740 Wt. 50.0**

This location display verifies the calibration weight and raw number that the system used in calibration. The calibration process is complete. It is a good idea to remove the test weight from the weigh assembly while this display is on the screen. The values should go to: # = 261 Wt. = 0.0.

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## Procedure for Calibrating

1. Disconnect compressed air and electricity to the scale.
2. Look to see that all gates, or spouts, are open.
3. Blow off the entire scale with compressed air. Use special attention to insure that the inside and outside of the weigh assembly are as clean as possible.
4. Reconnect the compressed air and electricity to the scale. Apply the air slowly so that the rush of air does not damage any of the gates or load cells.
5. Refer to the FINGER Flow Chart, Column 3. When you reach the third item, enter the weight of the test weight you will be using for calibration.
6. Complete through the fourth item. The display will show *Calibrating Zero*
7. When you are ready to perform the fifth item, before pressing *Exec*, apply your weight to the weigh assembly.
  - a. Hang your test weight from the bag spout - directly from the center. If your machine is a net weigher it may be easier to place four weights on each corner on the top side of the weigh hopper. Some applications may be easier to pour into the weigh hopper and exact amount of product out of a bag.
  - b. Press *Exec*. The display will show *Calibrating Max*, and then will change to the sixth item.
  - c. Remove the test weight.
8. Menu back to Column #1 (Run Mode).
9. In the Run Mode, check weigh a few weightments using a separate check weigh scale. If there is a difference between the two weights, calculate a corrected value using the formula below.

### **Formula to correct the calibration weight (Column #3, Item #3)**

True weight (check weigh scale weight) divided by displayed weight (Johnson scale) multiplied by the value recorded in Column #3, Item #3, equals your new calibration value.

$$\frac{\text{Wt. (check weigh scale)}}{\text{Wt. (Johnson scale)}} \times \text{value (Col.3, Item3)} = \text{corrected value (Col.3, Item3)}$$

10. Enter this corrected value in the third item of column #3.
11. Repeat steps 5 through 9.

The “Raw numbers” viewed while calibrating should, with no weight applied, be between 120-450. With the maximum weight applied (heaviest bag weight), this number should not be above 3,000. Preferably around 2,500.

If these numbers do not reflect this, the raw numbers may need to be reset. (See the “Load Cell Transmitter” page, later in the manual)

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## Column #4

**Position # =1**

**Active ON**

Column #4 correlates to position #1 (first position from the left) of the *Desired Weight* selector switch on the front of the control pedestal.

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**Position # =1**

**Desired Wt. =20.000**

This is the desired weight that the operator wishes to obtain with each weighment.

---

**Position # =1**

**CP Target Wt. =19.3**

This number is used to accomplish the first weighment only.

---

**Position # =1**

**Cut off Wt. #1 =19.1**

This is the value the system is currently using to obtain the *Desired Weight*. As the system auto-checks, this number will be automatically adjusted. It is not used on the first cycle.

---

**Position # =1**

**Cut off Wt. #2 =20.0**

Only for scale #2 of a duplex machine.

---

**Position # =1**

**Low Wt. % = 2**

This is the percentage of the desired weight that you are allowing for any particular weighment to be under. The system will not automatically release a weighment that is beyond this percentage, *Manual Discharge* will need to be pushed.

---

**Position # =1**

**High Wt. % = 2**

This is the percentage of the desired weight that you are allowing for any particular weighment to be over. The system will not automatically release a weighment that is beyond this percentage, *Manual Discharge* will need to be pushed.

---

**Position # =1**

**Mtr. Factor =2.0**

This value is used only on a system which uses a motor to run the feed assembly. This is the degree of *slope* (Ramp). The motor slows down as the weight increases. If applicable.

---

**Position # =1**

**Initial Speed = 100**

This value is the percentage of motor speed the feeder uses at the beginning of material delivery. This will be automatically adjusted to provide the desired fill time. If applicable.

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## Column #4

**Position# =1**

**Flow Shut Speed = 50**

Not used for most applications. This is the percentage of motor speed the system uses to activate a two position gate. If applicable.

---

**Position# =1**

**Ending Spd = 5**

This is the percentage of motor speed that the motor drive should be at when desired weight is obtained. If applicable.

---

**Position #1**

**Hold Time = 1.00**

This is the amount of time that the *Full* weightment will remain in the weigh assembly, before it is released. This allows the scale assembly to “settle” before that weightment is recorded. However, the scale will not discharge this weightment until it receives the signal to do so.

---

**Position #1**

**Dump Time = .100**

Used in Net Weighers only - This is the amount of time that the weigh hopper gate remains open after 90% of the weighed product has left the weigh hopper. When this has timed out, the gate will then get the signal to close.

---

**Position #1**

**Reset Time = .100**

Used in Net Weighers only - This is the amount of time that the system allows before starting a new cycle. This will give the weigh hopper gate the time needed to physically close (after the *Dump Time* times out), before new product is brought into the weigh hopper for another cycle

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## Column #5

Same as Column # 4 except:

Desired Wt .....	25.0
CP Target WT. ....	24.3
Mtr. Factor .....	2.0

## Column #6

Same as Column # 4 except:

Desired Wt .....	40.0
CP Target WT .....	39.3
Mtr. Factor .....	2.0

## Column #7

Same as Column # 4 except:

Desired Wt .....	50.0
CP Target WT .....	49.3
Mtr. Factor .....	2.0

## Column #8

Same as Column # 4 except:

Desired Wt .....	10.0
CP Target WT .....	9.3
Mtr. Factor .....	2.0

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## Column #9

### **Set State #1**

#### **State #1 = Ready**

This indicates that the FINGER sees that the contents of the weigh assembly have been discharged, and all parameters are set to run another cycle.

---

### **Set Feed Motor #1**

#### **Mode = Off**

Turning this from *off* to *on*, will start the mechanical feeder, which brings product to the weigh assembly. (If applicable)

---

### **Set Feed Valve**

#### **Mode = Open**

Turning this from *open* to *closed* will close the two position gate. (if applicable )

---

### **Set Hopper Valve**

#### **Mode = Closed**

Turning this from *closed* to *open* will open the cut off gate, above the scale assembly.

---

### **Set Dump Valve**

#### **Mode= Closed**

Turning this from *closed* to *open* will open the weigh hopper gate. ( if applicable )

---

**Note:** If your system is a duplex, each item will have a #1 and a #2.

**Note:** Be sure all of these items set correctly. If not, the scale will not cycle properly. However, cycling the electricity will automatically reset them to their proper position.

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## Column #10

### **Configure Printer**

#### **Connected = On**

*On* indicates that the FINGER recognizes that a printer is either connected, or can be.

---

### **Configure Printer**

#### **Baud Rate = 9600**

Speed at which the FINGER is sending data to the printer.

---

### **Configure Printer**

#### **Parity = None**

Error checking

---

### **Configure Printer**

#### **Data Bits = 8**

This is the amount of data sent per transmission

---

### **Configure Printer**

#### **Stop Bits = 1**

At the end of a transmission.

---

### **Configure Printer**

#### **Chars/Line = 24**

The number of spaces from left to right before it goes to the next line.

---

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## Column #11

### **Weight Totals/Stats**

**Cycle #1 = 0**

This is the number of recorded weighments.

---

### **Weight Total/Stats**

**Total Wt. #1 = 0.0**

This is the total accumulated weight. All weighments added together.

---

### **Weight Totals/Stats**

**Mean Wt. #1= 0.00**

This is the average recorded weight, of all weighments.

---

### **Weight Total/Stats**

**Min. Wt. #1 = 0.00**

This is the lightest recorded weighment.

---

### **Weight Total/Stats**

**Max. Wt. #1 = 0.00**

This is the heaviest recorded weighment.

---

**Note:** The first two cycles are not included in this process.

**Note:** Pushing the *Change of Product* push button, on front of control pedestal, will Zero out any of these accumulated numbers. The information must be retrieved before pushing *Change of Product*.

**Note:** A duplex system will have items for scale #2 also.

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## Column #12

### **Configure Options**

#### **Time Out = Off**

When turned *off*, the feeder system will continue to run, attempting to bring product to the weigh assembly, whether there is product to be weighed or not. It will continue to run until the scale comes up to weight, the *Manual Discharge* button is pushed, or the *Main Power* switch is turned off.

When *Time Out* is turned *on*, the scale will stop in the middle of a cycle, if the system has been running for more than 3 times as long as the last recorded *Fill Time*.

---

### **Configure Options**

#### **Foot Pedal = On**

When turned on, the system will need to see a signal before it either discharges, or starts another cycle.

---

### **Configure Options**

#### **Dec.Places= 1**

This is how many digits past the decimal point your display will display. Example: If this number is set to 1, then your system will display 20.0 If this number is set to 2, then your system will display 20.00

---

### **Configure Options**

#### **AZero Time=2**

This is the amount of time that the system will pause, before recycling, to auto zero. This time allows for everything to settle before zeroing.

---

### **Configure Options**

#### **DsWt. Adjust=.050**

This number is automatically added to the *Desired Wt*. This keeps your weighments on the heavy side of target weight, (if applicable)

---

### **Configure Options**

#### **CK Wt. Range=.05**

If the finished weights are this close to *Desired Wt* the system will not *Auto Check* any farther. This prevents the system from continually try to *Check Weigh* into the 1000ths of a pound.

---

**Note:** These functions can only be turned off or on when the FINGER is reinitialized. After that, only viewing of their settings is possible.

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## List and Description of all FINGER Inputs

(Left to right - Bottom of FINGER)

- Ground: ..... No connection
- Pin 01: ..... No connection
- Pin 02: ..... No connection
- Pin 03: ..... *Main Power*, front of pedestal,
- Pin 04: ..... *Main Power*, front of pedestal, (scale #2 - Duplex, if applicable)
- Pin 05: ..... *Auto Run* switch, on front of pedestal, to cycle the scale  
On a gross weigh scale, this pin will have a jumper wire to Pin10.
- Pin 06: ..... *Manual Dump* scale #1, on front of pedestal
- Pin 07: ..... *Manual Dump* scale #2, on front of pedestal, (Duplex, if applicable)
- Pin 08: ..... *Print Stats* from printer
- +5V: ..... No connection
- Pin 09: ..... *Change of Product* push button on front of pedestal
- Pin 10: ..... Foot pedal on a gross weigh scale - starts the cycle  
Foot pedal on a net weigh scale - discharges the weigh hopper
- Pin 11: ..... *Desired Weight* rotary switch on front of pedestal, position #1 (left)
- Pin 12: ..... *Desired Weight* rotary switch on front of pedestal, position #2
- Pin 13: ..... *Desired Weight* rotary switch on front of pedestal, position #3
- Pin 14: ..... *Desired Weight* rotary switch on front of pedestal, position #4
- Pin 15: ..... *Desired Weight* rotary switch on front of pedestal, position #5 (right)
- Pin 16: ..... Net weigh scale - no connection  
Gross weigh scale - this pin will have a jumper to GND Pin next to it.
- Ground: ..... Provides ground for the "Desired Weight" rotary switch  
On Gross Weigh scale, sends ground to Pin 16.

**NOTE:** Pins 03, 04, 05, 06, 07, 09, and 10 each go through a yellow optical coupler before the FINGER.

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## Basic flow of all Input signals to the FINGER

FINGER inputs are located on the bottom side of the FINGER.

1. Except for the ground pin on the far left, and the ground pin on the far right, all the inputs should have 5 VDC, when a signal is sent to a particular input, the optical coupler should close, and drop that 5 VDC off, when the FINGER sees there is no longer voltage at that input, it will then know to activate that input to the software.
2. All inputs go through the optical coupler board except for: Pin 8, which is the *stats* button of the printer, if applicable. Pins 11 thru 15, which comes directly from the *Desired Weight* rotary switch. Pin 16 goes to *Ground* if the machine is a gross weigher, pin 16 would be blank for a net weigher.
3. There is a input marked +5V, there is no connection.
4. Pin #5 & #10 will be jumpered on a gross weigher.

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## List and Description of FINGER Outputs

(Left to right - Top of FINGER)

- +DC: ..... Receives 24 VDC from power supply
- K: ..... Jumper to +DC
- GND: ..... To load cell, etc.
- HV01: ..... Feeder motor, Scale #1 (Belt, Auger, Vibratory)
- HV02: ..... Feeder motor, Scale #2 (Belt, Auger, Vibratory)
- HV03: ..... Two position flow gate, Scale #1
- HV04: ..... Two position flow gate, Scale #2
- HV05: ..... Cut off gate, Scale #1
- HV06: ..... Cut off gate, Scale #2
- HV07: ..... Weigh hopper gate, Scale #1
- HV08: ..... Weigh hopper gate, Scale #2
- HV09: ..... No connection
- HV10: ..... No connection
- HV11: ..... No connection
- HV12: ..... Auto Calibration
- HV13: ..... Dump Complete
- HV14: ..... Bag Clamps
- 485+: ..... Digital Display
- 485-: ..... Digital Display

**Note:** V01 and HV02 go to Red optical couplers - start/stop feeder motor. On vibratory feeders, the optical couplers will be black. All other outputs go through black optical couplers.

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## Basic flow of all FINGER Output Signals, Controlling Scale Functions

FINGER outputs are located on the top side of the FINGER.

1. Except for the +DC (receives 24 VDC from the power supply), K, GND, 485+ & 485-, all outputs will have 5 VDC going out when that output is **not** activated. When that output is activated, by the FINGER, that voltage will drop to 0 ( $\pm 0.3$  volt).
2. Outputs HV01 through HV14 all go through the ribbon cable, and into the optical coupler board, found at the bottom of the control pedestal. A slide on connector connects the cable to the board.
3. When the FINGER activates an output, it also lights up the indicator light, above the corresponding optical coupler. This will show you that the signal is getting from the FINGER, through the cable, into the optical coupler board, and at least to the indicator light.

If the indicator light does not light up:

- a. Meter the output at the FINGER, it should be zero voltage ( $\pm 0.3$  volt). If it is not, the FINGER output may be bad.
- b. If that output is zero voltage, check the wire connection. Also, unplug the ribbon cable connector from the optical coupler board, clean it very well, and then plug it back in. If the indicator light still does not light up, and assuming the light itself is good, then it is possible that the board itself could be bad.

If the indicator light does light up:

- a. Check the voltage below the optical coupler at the *even* numbered terminal. If the optical coupler is Black, the voltage should be AC, if the optical coupler is Red, the voltage should be DC.
- b. The *odd* numbered terminal should have voltage; check to make sure. If you still do not have voltage at the *even* numbered terminal, either the optical coupler is bad, or the small fuse plugged in beside the optical coupler could be blown. If changing the optical coupler does not fix the problem, then change the fuse. However, if a solenoid valve, that this output is controlling, is shorted, then that could blow the fuse.

**Note:** If the light is on, optical coupler is good, and the fuse is good, then the voltage should go from the *odd* numbered terminal, to the *even* numbered terminal, of the optical coupler board.

**Note:** Except for the first two (right to left), all the black optical couplers should have 120 VAC jumpered to the *odd* terminal.

# Johnson Manual

## Procedure for Reinitializing the *FINGER*

This is done to erase the “RAM” chip (Random Access Memory). Reasons for carrying out this procedure might be: (a) the system does not seem to be running properly because of faulty programming, or (b) after an electrical “spike”, or (c) to change the settings in Column #12.

**Note:** Once the RAM chip is erased, all parameters must be reentered, including the calibration.

**Note:** Be sure that you have all of your program settings, in columns 2-12, written down so that you can re-enter them.

**Note:** It is recommended this procedure never be carried out without first contacting Johnson & Sons.

1. Turn off incoming electricity to the system.
2. Wait 20 or more seconds.
3. Turn electricity back on.
4. While *Johnson Brothers weighing system 6.0* is displayed on the FINGER, press *Exec*.
5. *Mode= Gross Weigher, press any key will be displayed or Net weigher* if applicable. Do not press anything. After about 8 seconds, the display will change to:
6. *Set up mode Activated, press any key.* Do not press anything. After about 8 seconds, the display will change to:
7. *Initializing Variables, Motor Speed Calcs* After about 8 seconds, the display will change to:
8. *Configure Options, Time Out = Off,* Leave this to off, press *Item* the display will change to:
9. *Configure Options, Foot Pedal= On,* Leave this to on, press *Item*, the display will change to:
10. *Configure Options, Dec. Places = 1,* Leave this to 1, (unless your programming says otherwise). Press *Item* and the display will change to:
11. *Configure Options, AZero Time = 2,* Leave this to 2. Press *Item* and the display will change to:
12. *Configure Options, DsWt.Adjus t= .075,* Change this to .05, (unless your programming says otherwise). Press *Item* and the display will change to:
13. *Configure Options, CK Wt. Range = 1,* Change this to .05, (unless your programming says otherwise).
14. Press *Item* and the FINGER will begin to go through its normal set up routine. When it is finished it will stop at *Date & Time*. At this time you will need to go through the programming of the FINGER and set all of your parameters, including your calibration.

**Note:** While entering information if you delay too long *hit any key* will begin flashing. Press the *Field* key, and it will bring you back to the same screen that you were at. Pressing any other key will bring the screen back up, but it will advance you to the next stage.

# Johnson Manual

## Signal to Discharge or Start the Cycle

**NOTE:** Net weigher: *Auto Run* switch on the front of the control pedestal sends the signal to start the cycle. The foot pedal contacts discharge the weigh hopper.

Gross weigher: The foot pedal starts the cycle.

Basic flow of the *Dump signal* coming from the foot pedal or external equipment, telling the scale it is OK to discharge. 120VAC comes from the one-shot timer inside the rear control box, to the dry contacts of the foot pedal or outside equipment. When these contacts are closed, the signal is returned to the one-shot timer which then sends a 1/4 second signal to the optical coupler board, and then to input PIN10 of the FINGER. The one-shot timer will not recycle until the dry contacts open, and then close again. Once the FINGER sees that the scale is full, and the weightment is within tolerance, and the signal to discharge has been received, the weightment will then be discharged. The signal can be received by the FINGER at any time, regardless of the stage of the weighing cycle.

The basic flow of the “initiate start” signal from the foot pedal. 120VAC comes from the one-shot timer inside the rear control box, to the dry contacts of the foot pedal or outside equipment. When these contacts are closed, the signal is returned to the one-shot timer which then sends a 1/4 second signal to the optical coupler board, and then to input PIN10 and PIN05 of the FINGER. This signal will start the cycle.

# Johnson Manual

## Dump Complete Signal

This signal is sent to external equipment that needs to know when the scale has finished discharging its weigh hoppers. This signal would be used by such equipment as a bag hanger, form fill & seal, or block press.

1. When the discharge is complete, a signal will be sent from the FINGER output. The signal then activates an optical coupler inside the control pedestal.
2. That optical coupler will send 120VAC to the mechanical relay inside the pedestal.
3. The relay then sends a signal to the one-shot timer located next to it.
4. When the one-shot timer receives this signal, it closes a set of dry contacts for 1/4 second.
5. The outside equipment would receive a closed set of dry contacts for 1/4 second.

**NOTE:** The length of time the set of dry contacts is closed can be changed if necessary.

**Insert VFD programming here**

# Johnson Manual

## Load Cell Transmitter

1. The transmitter is located in the gray enclosure mounted on the back side of the scale. It is mounted on a sliding track; you can remove the transmitter from the box by sliding it straight up, out of the slide.
2. There is one transmitter per scale. A duplex would then have two transmitters.
3. There is a indicator light that when lit, is showing that the transmitter is receiving proper working voltage. If the light is out, or blinking, there may be a problem with the voltage coming to it.
4. There are three potentiometers:
  - a. **"10 VDC"** = adjustment to set 10.00 volts that goes to the load cells.
  - b. **"Zero"** = Sets the raw #s on the low side, with no weight being applied to the weigh assembly. (see "Your Programming", for this value)
  - c. **"Span"** = Sets the raw #s on the high side, with weight being applied to the weigh assembly. (see "Your Programming", for this value)Turning these potentiometers clockwise should raise the number. However, when turning the Span up, this will move the low # slightly up. Same when turning it down. Turning the "Zero" will also move the high number slightly.
5. There are also two different groups of "set up switches."
  - a. **Switch #1 positions are as follows:** 1= Off, 2 & 3=On, 4=off, 5= on, 6=off, 7=on, 8=off
  - b. **Switch #2 positions for are as follows:** 1- 5=off, 6-8=on

**Note:** Never change these switches while power is on, it will blow out the transmitters.

# Johnson Manual

## Basic flow of the Load Cell signals

1. Each scale has two load cells per weigh assembly, a duplex then would have four. (Some of the small weight scales may only have one load cell.)
2. The load cell bases are bolted to the ridged frame work by two bolts. The weigh assembly is attached to the “single point” end of the load cell, by a “rod eye” bearing, which allows the weigh assembly to hang freely, without putting the load cell in a bind.
3. Gross weigh scale buckets will simply hang from the rod eye bearings, and swing freely. Weigh hoppers in a net weigher will hang from the rod eye bearings, but there will be a sway cable connected from the lower side of the weigh hopper, and then to the frame work. This cable prevents the weigh hopper from swinging. The tension should be snug, but not too tight.
4. There are two wires going into the load cell and two wires going out.
5. The same wires from the two load cells are tied together.
6. **100 pound load cell color code**      **250 pound load cell color code**  
Green= Excitation plus (voltage)      Red= Excitation plus (voltage)  
Black= Excitation minus                  Black= Excitation minus  
White= Signal plus                          Green= Signal plus  
Red= Signal minus                          White= Signal minus
7. All load cell wires are connected to the load cell transmitter, which is located inside of the small gray enclosure where the load cell cables go to. The basic function of the transmitter is to supply 10 VDC to the Excitation plus, supply Excitation minus. The signal plus and signal minus come to the transmitter by milli-volts. The transmitter then converts that milli-volt signal to milli-amps.
8. 24 VAC is sent to transmitter terminal #21 from FINGER terminal # DC+ located on the top left corner of the FINGER. The transmitter regulates that voltage down to 10 VDC and applies that 10 VDC to the excitation plus of the load cell.
9. DC ground comes from the FINGER ground to transmitter terminal #22. That ground is then applied to excitation minus of the load cell.
10. As weight is applied to the load cells, that signal is sent out of the load cell by milli-volts to transmitter terminal #41 for signal plus, and terminal #42 for signal minus.
11. The transmitter then converts that milli-volt signal to milli-amps.
12. The milli-amp signal is then transmitted to the “impedance module”, located next to the FINGER inside the control pedestal.
13. The impedance module acts as a filter, and a buffer.
14. That signal goes through the impedance module and in to the A/D board located next to the FINGER.
15. That signal is then converted to “digital” and then sent to the FINGER, and once calibrated, that digital signal will represent weight.

# Johnson Manual

## Pneumatic System

Air cylinders on most of the gates, etc., are controlled by solenoid spool valves.

1. Plant's supply of compressed air is connected to the regulator provided. (90 PSI for most systems unless specified.)
2. After the air is regulated and filtered, it goes to the air input of each air control valve. Some systems may have a "valve bank" which is supplied by a single input.
3. The air control valves are four way, spring return valves.
4. One of the output ports will be *normally open*, allowing the compressed air to flow through the valve and to the cylinder.
5. The *normally open* air port, usually, will go to the side of the cylinder that will keep all gates and spouts closed, and bag clamps open, without any electrical signal.
6. When an electrical signal (AC) is applied to a particular valve, the coil in the solenoid will shift the spool, switching the air flow to the opposite side of the cylinder, causing a gate to open, or bag clamps to clamp.
7. That *inner spool* has an outside plunger that can be worked manually, for trouble shooting purposes. Pushing in on the plunger will shift the spool, which will work the cylinder.
8. The valves are equipped with indicator lights. If the light is on, the valve is receiving a 120 VAC signal from the control pedestal. If the valve is not working, make sure the "neutral" going to the valve is OK. Then replace the coil. Make sure always to clean the spool, before replacing a coil.
9. All the air control valves, except for *Auto Calibration* valves, have built in flow controls. These flow controls regulate the speed at which the air is allowed to exit the cylinder, regulating the speed at which the cylinder will travel.
10. The entire air system is designed to operate dry, unless specified. There should be no reason for lubricators.

# Johnson Manual

## Printer Connections

(when applicable)

1. From 12 volt power supply, 12 VDC goes to one terminal of the Printer OFF/ON selector switch. When that switch is turned *on* it allows the 12 VDC to go to the power input of the printer (Red wire). The other power input wire of the printer goes to DC- (Black wire).
2. The “telephone” cable connects to the right side of the FINGER and then to the data inlet of the printer.
3. A wire goes from ground to one side of the *print stats* push button. Another wire goes from the other side of the switch, then to PIN08 of the FINGER.

## Operation of the Printer

If you prefer to print only the “Stats”:

1. Have the printer switch in the *off* position.
2. Cycle the desired number of weighments.
3. Before pushing *Change of Product* for another run, but after the scale has stopped cycling, turn the Printer switch *on*.
4. Push the *Stats* push button. The printer will then print out all information in column #11 of the FINGER flow chart.

If you prefer to print each weighment as the scale cycles:

1. Before *Change of Product* is pushed, turn the printer switch to the *on* position.
2. Each weighment of the scale will be printed out every cycle.  
**NOTE:** This will use up a lot of paper and ribbon.
3. When “Stats” are needed, press “Stats” at anytime.

# Johnson Manual

## Maintenance

### Daily:

1. Disconnect the compressed air.
2. Make sure all the gates and spouts are open.
3. Clean the entire system using special attention around the weigh assembly, (inside and out), and the auto calibration assembly (if applicable). Using a nozzle, blowing compressed air, will normally do the job. However, if any build up exists in, or on, the weigh assembly, it is important to remove it all. Scraping the build up off may be necessary.

**Note: Never use water or liquid of any kind.** This could seriously damage your system.

4. When reconnecting the compressed air to the regulator, turn it on slowly. The rush of air could damage a gate or load cells.
5. Inspect all air components for leaks.
6. Before starting the system back up, be sure to go through a "Change of Product." This will automatically "Zero" any change in the weigh assembly after cleaning.
7. If your system has a mechanical feeder, inspect that all belts are in line, chains are in good working order, etc.
8. While the system is cycling, watch and listen to all gates and cylinder speeds to make sure nothing has changed.
9. If your system has vibratory feeders, it is important that you listen to the vibration. If, for example, an internal spring is broken, you would hear a loud "banging." This must be repaired to prevent damage to the feeder.
10. Check all flow gates to make sure there has been no change in their settings.
11. Check the cycle rate of the scale and the accuracy of the weighments, to be assured all is operating properly. You can check this by looking at the "Fill Rate" on the FINGER screen.
12. Net weighers: Be sure that the weigh hopper gates are completely closed before the next cycle begins.
13. Gross weighers: Check the position of the bag closing conveyor below the scale. With a bag suspended from the bag clamps, make sure that nothing is touching. This will seriously affect the accuracy of each weighment.
14. All electrical conduits running to and from the control pedestal should be inspected. If any damage exists, it is very important that it be repaired before any damage is done to the wiring.
15. Inspect the control pedestal. Make sure the rear door is closed and the inside is dust free.

**Note:** It is OK to "blow out" the inside of the control pedestal with air; however, the air must be dry. Do not have the nozzle too close to the components.

**Note:** We cannot stress enough the importance of keeping this system as clean as possible.

# Johnson Manual Maintenance

## 2 weeks:

1. Grease all “bushings” very well.
2. Grease all sealed bearings with two pumps of the grease gun.
3. Oil the mechanical feeder’s drive chain. (If applicable)
4. Net weigher: Check the cable that prevents the weigh hopper from swinging freely. This cable should be “snug,” not real tight, but definitely not loose.

## Monthly:

1. After the daily cleaning, go to Column #3, item #4, in the FINGER. Check the value. Make sure it is still within approximately 200 counts of where your book says it should be.  
**Note: Do not press Exec, only view the number.**  
If, for some reason, the number has increased or decreased too much, there may be something wrong with the electronics, or with the weigh assembly.
2. If the system has a motor drive running the feeder, check the 90 wt. gear lube in the gear box.
3. Check to make sure that the operators are running the system properly.
4. Check all bolts & linkages.

# **Johnson Manual**

## **Set-Up Routine when Electricity is cycled off and then on**

(Leave electricity off for at least 20 seconds or more)

As soon as electricity is turned on, the following will be displayed:

***Johnson Brothers Mfg.  
Weighing System 6.0***

This will display on the FINGER for approximately 8 seconds and then the screen will change to:

***Mode: Gross Weigher (or Net Weigher if applicable)  
press any key***

Do not “press any key.” After about 8 seconds, the display will change to:

***Configuring RS-232***

After about 8 seconds, the display will change to:

***No DAC Board Found  
press any key***

Do not “press any key.” After about 8 seconds, the display will change to:

***Dumping Hoppers-wait  
press any key (if applicable)***

Do not “press any key.” If the scale is a “net weigher,” you will hear the weight hopper discharge, and then close. The display will then change to:

***Hit Any Key for Menu  
Date & Time will be flashing***

Press the *Menu* key. This will move you to column #1 if the scale is calibrated. If the scale is not calibrated it will move to column #2.

**Note:** While the system is setting up it will not cycle. (The set up process takes approximately 20 seconds.)