

# MULTIHEAD WEIGHER MANUAL 

Models<br>MHW10<br>MHW14

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## 1 PREFACE

Thank you for choosing Ohlson Packaging for your packaging needs. Ohlson Packaging has been designing and manufacturing packaging equipment for more then 40 years.

The Multihead Weighing Machine is a fully automatic computerized scale specially designed for packaging of granular materials.

This manual will help users use and maintain the equipment, it specifies the regular usage
and basic maintenance measures.

### 1.1 BASIC DESCRIPTION

1. The machine adopts factorial theory, and chooses the closest combination to achieve the target weight.
2. The machine is designed to weigh a variety of granular products.

### 1.2 NOTICE

1. Please read this manual carefully before using the machine.
2. Environmental requirements :
3. Temperature : $-5 \sim 40^{\circ} \mathrm{C}$
4. Humidity: 35-85\%
5. Electrical power: AC $220 \pm 5 \mathrm{~V} 50-60 \mathrm{HZ}$
6. Installation surface: On rigid, horizontal and vibration-free surface
7. Grounding : Make sure the grounding terminal is grounded.
8. Weigh bucket is extremely sensitive, do not bump or apply pressure on weigh buckets.
9. Press the CLEAN OUT key to remove any remaining product in the system
10. Zero the machine before each run for best performance.
11. Power should be removed from the system prior to cleaning and maintenance.
12. Only authorized personal should perform maintenance on machine.
13. Machine should be connected to power source on a dedicated circuit.

## 2 MAIN PARAMETERS AND FEATURES

| Parameter | Machine Model No. |  |
| :--- | :---: | :---: |
| Item | MHW-CW14 | MHW-CW10 |
| Voltage | AC220V Single Phase | AC220V Single Phase |
| Power Frequency | $50 / 60$ | $50 / 60$ |
| Required Current | 10 A | 9 A |
| Power | 2.0 KW | 1.5 KW |
| Number of Weigh Buckets | 14 | 10 |
| Max. Weight | 3000 g | 3000 g |
| Weigh Range | $10-3000 \mathrm{~g}$ | $10-3000 \mathrm{~g}$ |
| Weigh Volume | 1300 mL | 1300 mL |
| Max. Weigh Speed | $140 \mathrm{bags} / \mathrm{min}$ | $80 \mathrm{bags} / \mathrm{min}$ |
| Preset Product Nos. | $0-99$ | $0-99$ |
| Machine Weight | $925 l \mathrm{bs}$ | 555 lbs |

## 3. Theory of Operation

### 3.1 Infeed System

Error! Objects cannot be created from editing field codes.

Illustration 3-1-1

Product is delivered by Conveyor into the Infeed Funnel, and then distributed to the Linear Feeders with the help of the Top Cone. Product thickness can be controlled by adjusting the Infeed Funnel height. As shown in illustration 3-1-1.

### 3.2 PRODUCT DISTRIBUTION AND WEIGHING



Illustration 3-2-1

Product is distributed evenly into each Linear Feeder Pan and stored in the Feed Bucket. When the weigh bucket completes the previous weighment, product in Feed Bucket transfers into the Weigh Bucket to be weighed and combined.

### 3.3 COMBINATION

The computer stores the data received from each Weigh Bucket, and performs numerous calculations, and then selects the one closest to the Target Weight.

1. Parameters of Weigh Bucket: "AFC", "MF AMP", "LF AMP", "TARGET NO.", "SINGLE WT".
(Details refer to 6.2 PROGRAM SETTING)
AFC0 : The higher the settings are for the "MF AMP" (Main Feeder Amplitude) and "LF AMP"
(Linear Feeder Amplitude), the heavier the single bucket weight will be.
AFC1 : Higher the "TARGET NO."(Target Bucket Number), the lighter the single bucket weight.

AFC2 : Higher the "SINGLE WT"(Single Bucket Weight), the heavier each bucket weight.
2. Parameters of combination : "OPTIMUM", "ENFORECE", "RESERVE". (Details refer to 6.6 PROGRAM SETTING)

OPTIMUM : the larger this value, the greater the accuracy. As illustrated in illustration 3-3-1, the "OPTIMUM" is 10 , then the best combination "\#3" will be selected.

ENFORCE : The larger this value, the higher the pass rate. As illustrated in illustration 3-3-2, if
there is no acceptable combination and suppose the Combined Buckets Number $\geq$ "ENFORCE", then enforced-dump will be performed to increase the performance of the machine.

RESERVE : Used to set the multiples of "UP LIMIT" for combined weight which failed previous combination and to be re-combined, during enforced-dump operation. This is to reduce the deviation of unacceptable package weight.


Illustration 3-3-1


Illustration 3-3-2

### 3.4 Discharging

There are two methods to discharge product to the down stream equipment:

1. Direct Dsicharge: Product is directly dumped from the weigh buckets though the collating funnel. Relevant parameter ".Collection Funnel"set to "0"。
2. Timing Hopper: Product is dumped from the weigh buckets into a timing hopper. As shown in Illustration 3-4-1

Relevant parameter : when"Collection Funnel"is set as " 1 ","Multi-dump"as " $N$ ", Collection Funnel will operate just one time after the Collating Funnel has dumped product for " N " times.


Illustration 3-4-1

## 4. MACHINE STRUCTURE

### 4.1 MAIN COMPONENTS



Illustration 4-1-1

| 1 | Infeed Funnel | 10 | Main Circuit Breaker |
| :---: | :--- | :---: | :--- |
| 2 | Level Sensor | 11 | Base Frame |
| 3 | Top Cone | 12 | Collating Funnel |
| 4 | Linear Feeder Pan | 13 | Display Cable |
| 5 | Feed Bucket | 14 | HMI |
| 6 | Weigh Bucket | 15 | Individual Head Unit |
| 7 | Collating Chute | 16 | Linear Feeder |
| 8 | Eye Bolt | 17 | Main Feeder |
| 9 | Main Power Switch |  |  |

### 4.3 COMMON PARTS

### 4.3.1 WEIGH BUCKET INSTALLATION

1. As shown in illustration 4-3-1 and 4-3-2, mount the upper fixed rod into the proper slot and rotate the bucket down to lock in position.


Illustration 4-3-1


Illustration 4-3-2

### 4.3.2 FEED BUCKET INSTALLATION

1.The feed bucket is installed just as the weigh bucket. Please refer to section 4.3.1 for installation.

### 4.3.3 LINEAR FEEDER PAN INSTALLATION

Feeder Pan: As illustration 4-3-3 shows, insert component marked "a" into the location marked "b" and rotate the pan down into place. Move the lever to the up position to lock the pan in place.

NOTE: If pans are installed properly, they should not hit each other.


## 5 . Daily Operation

### 5.1 Main menu

Upon power up the main menu will be displayed as shown in Illustration 5-1-1. The main menu allows the operator to perform the zero and clear functions.


Illustration 5-1-1

### 5.2 Daily Running

### 5.2.1 Zeroing Function

The zero function should be performed prior to running each product. The function empties the weigh buckets, clears the A/D boards and sets the zero point for the empty bucket. If there is any problem with the scales, the run menu will appear showing the scale with the problem. Further diagnostics are required at this point.


Illustration 5-1-2

### 5.2.2 Clear Function

1. The clear function is used to empty the remaining product in the machine. It will continue the process until the stop button is pressed.

### 5.2.3 Running Menu

Enter the running menu by pressing the "1. run" button on the main menu. The screen in Illustration 5-2-1 will be displayed.

1. Run Screen

1) The previous weight that was discharged is shown on the right side of the screen.
2) Pass/Fail is shown if the last weight discharged was in the acceptable range.
3) Program Number: the system can records 99 sets of programs for the requirement.
4) Target weight: shows the desired discharge weight.
5) Accuracy (Up limit(+), Down limit(-)): the acceptable weight range

Up Limit: The maximum over weight desired.
Low Limit: The minimum weight desired.
6) Ave bucket: The average quantity of buckets that combine to achieve the desired target weight. This is a good indication of the machines performance. The machine will run at max performance if the average is between 3-5.
7) Actual Sp : The average speed the system was running over the last 30 seconds.
8) Target Speed: Enter the desired throughput.
9) MF Amplitude: The amplitude of the main feeder is set from $0-100 \%$. Use the up/down arrows to modify.
10) LF Amplitude: The amplitude of the linear feeder is set from $0-100 \%$. The amplitude of the linear feeder is directly related to the amount of product in each weigh bucket. If the amplitude is higher, more product will fall into the feed bucket at a time. Use the up/down arrows to modify.
11) Run: Allows the machine to enter the run mode. Press the pause button to stop.
12) Circle: Shows the status of each bucket. ( Refer to the detail information below)
13) Return: Exit the running menu, and return the main menu.
2. Running Status - Color Detail on the Running Menu

Yellow : The weight inside the bucket is over the requirement; the system enforces the bucket to combine even if the output weight is overweight or underweight.

Red: The bucket has been combined in the previous discharge.
Blue: The bucket is ready to combine in the next combination.
Purple: There is a mechanical problem with the bucket.

Gray : No product in the bucket
Green: The system is Zeroing the bucket.
Black: The head is inhibited, it won't execute any instruction from the system.

Aqua : success in coercive combination

Cyan : Fail zeroing

White: The weighing bucket does not have enough product to reach its requirement.
3. Emergency - requires examination

### 5.3 Manual Operation

1. Press the "Manual Operation" button on the Main Menu to enter the manual operation mode.


Illustration 5-3-1
2. All components can be tested individually from the manual operation screen.
3. Function introduction
3.1 Cycle Run - Each lane can be tested for one cycle. If you press the button for lane 5, feed pan 5 should vibrate, the feed bucket should open and the weigh bucket should open once.
3.2 Continuous running - Each lane can be tested to run continuously. The process will start with the linear feeder vibrating and stopping, then the feed bucket will open and close and the weigh bucket will open and close. This process will automatically repeat until the stop button is pressed.
3.3 Linear Fd - The selected linear feeder will pulse one time.
3.4 Main Fd - The main feeder with pulse one time.
3.5 Feed - The selected feed bucket will open and close.
3.6 Weigh - The selected weigh bucket will open and close.
3.7 Collect - The collection bucket (optional) will open and close.
3.8 Wb Zero - The weight in the selected weigh bucket will be displayed.
3.9 Inhibiting head - Use to disable one head of the system. If for any reason a component does not work properly. The entire head will not be used in the run mode.

### 5.4 Statistic

The machine automatically stores data run on the system.


Illustration 5-4-1

### 5.4.1 Checking record

1. Enter the statistic from the main menu.
2. The system can record a max of 999 data sets.
3. Touch the Arrow key to select the year, month, date, then press "Enter" to confirm. The display will show all the records that were recorded on that day.
4. Check the Record

Input the record number and confirm by pressing the "ENT" key.
5. Clear all the records

Select the item "Clear all the records" and press "ENT" to clear all the records.
6. Last record

Select "Last Record" and "ENT", Last record will be shown.
7 . Select "Next Record" and "ENT", Next record will be shown.


Illustration 5-4-2

## 6 . System explanation

### 6.1 Program setting

1 Enter the Program settings by pressing the " 3 . Program set" key. The initial password is "111111", press "ent" to confirm.

1) Target Weight: displays the set weight in the current program
2) Up/Low Limit: displays the set accuracy limits in the current program
3) Program Selection: Displays the current program \# and allows the operator to select one of the 99 programs
4) Program copy: Input the number of original Program at the left side, and enter the number of target program on the right. Press "ENT" to start the copy process.


Illustration 6-1-1 1
5) Parameter Set: Enter the parameter page as shown in Illustration 6-1-2


Illustration 6-1-2
6.2 Parameter setting specification
a) Program Number

Displays the current Program Number. Please notice that the button is grey therefore it can not be changed from this screen.
b) Mf amp - Main Feeder Amplitude - Controls the level of vibrator on the infeed cone. It has a setting from 0-100\%
c) Lf amp - Linear Feeder Amplitude - Controls the level of vibrator for all the linear feed pans. It has a setting from $0-100 \%$
d) Lf on time - When the feed bucket calls for product the linear feeder vibrates. The amount of time the linear pan vibrates is controlled by the on time.
e) Fb delay - Feed Bucket Delay - After the feed bucket dispenses product into the weigh bucket, the linear feed pan vibrates. If the feed pan vibrates too soon the product will fall through the feed bucket and directly into the weigh bucket. The delay allows the feed bucket door to close before the feed pan vibrates.
f) Wb delay - Weigh Bucket Delay - After the weigh bucket dispenses product, the feed bucket dispenses more product into the weigh bucket. The weigh bucket delay allows the door on the weigh bucket to close before the feed bucket dispenses more product. If the feed bucket drops more product before the weigh bucket door closes, the extra product can drop into the previous weighment. Resulting in an over weight package.
g) Cb delay - Collection Bucket Delay - The amount of time necessary to allow the product to drop from the weigh buckets to the collection hopper before opening the collection hopper.
h) After cb time - After Collection Bucket Time - The amount of time required for the collection bucket to close before the weigh buckets drop the next weighment.
i) Product No. - The machine will display the product assigned to this program.
j) Target Weight - The desired package weight to be discharged.
k) Up Limit / Low Limit - The Upper limit and the Lower limit set the acceptable range that the machine will discharge as it searches for the closest combination to the target weight.
I) Target Speed - The desired throughput of the system.
m) Dis delay time - Discharge Delay Time - The amount of time required for the product to fall into the container before a signal is sent to the downstream equipment.
n) Dis on time - Discharge On Time - The amount of time the signal for the downstream equipment is on.
o) Zero Interval - After a set amount of time, the machine will re-zero the scales. If product becomes stuck to the weigh bucket, the machine will set the total weight of the weigh bucket and the stuck product as zero pounds.
p) Press the Page Down button to call up the second parameter screen.

q) Bias Weight - Actual Weight = displayed weight + the bias weight
r) No Load - If the weight in the weigh bucket is less than the "No Load" weight the bucket will be considered empty and the machine will continue to feed more product into the weigh bucket. Range $=1-99 \%$, recommended value $=10 \%$
s) No Select - If a weigh bucket is not combined and discharged after "No Select" amount of times, the machine will force the weigh bucket to discharge even if the weight is outside the range. Or it will affect the performance of the system.
t) Feed Time - The feed time is related to the aux infeed equipment such as a conveyor or bucket elevator. The machine will call for more product until the infeed sensor is tripped for the amount of time designated by the "Feed Time".
u) Feed Times - The system can automatically divide the target weight so that the system drops the total weight in more than one dump. Ex. Target weight $=500$ grams, if the Feed Times is set to 5 , the machine will automatically dump five weightments of 100 grams to total 500 grams before sending the signal to the downstream equipment.
v) Fb/Wb/cb Motor Pattern - The Feed Bucket, Weigh Bucket and Collection Bucket have four sets of Motor Patterns 0-3. The motor pattern controls how quickly the door(s) open, how long the door strays open and how quickly the door closes.
w) AFC - Automatic Feed Control - The system can automatically adjust the vibration of the pans to achieve certain criteria. A setting of 0 turns the AFC off. AFCT mode is activated by a setting of 1. AFCT automatically adjusts the feeders depending on the average number of buckets used in a combination. AFCI mode is activated by a setting of 2. AFCI automatically adjusts the feeders depending on the average weight in the individual weigh buckets.
x) AFCT Target No. - Desired average amount of weigh buckets in a combination.

Recommended value $=3-5$.
y) AFCT reset int - Number of discharges before the AFCT automatically changes the feeders.
z) AFCT limit no. - Allowable range for average number of weigh buckets in a
combination. Recommended value $=4.0$
aa) AFCI single wt - Desired weight for each individual weigh bucket. Typically $25 \%$ of the target weight. Note: this feature is used weather the AFC is off or in AFCI mode.
bb) AFCI reset int - number of discharges before the AFCl automatically changes the feeders.
cc) AFCI limit wt - Weight required for the weigh bucket to be considered in a combination. If the weight in the weigh bucket is less than the limit wt, more product will be added. Typically set to $90 \%$ of the AFCI Single Weight. Note: this feature is used weather the AFC is off or in AFCI mode.
dd) Sta interval - once a correct combination has been calculated, the number of weigh buckets involved in the combination can be discharged all at once or staggered.

Staggered discharge will prevent jamming in the chute on large weighments. The machine will discharge the weigh buckets all at once with a setting of 0 . Or the setting can be between 1 and 7. For example if the "sta interval" is set to 2 and there are five weigh buckets in the combination, 2 weigh buckets will open at a time, then the next two and finally the 5 bucket.

### 6.3 Calibration



Illustration 6-3-1

1. Before entering calibration mode be sure to empty the weigh bucket(s) to be calibrated.
2. Select " 5 . Calibration" from the main menu. Calibration mode is protected by password 1. Enter password 1 and press enter. Password 1 is set to " 111111 " from factory
3. Enter the number of the weigh bucket to be calibrated and press enter. The current value will be displayed live and the zero key will light up.
4. Press the enter key to set the new zero. The display will hold the value.
5. When the "full" key lights up, place the 1 kg weight on the correct weigh bucket. Allow 20 seconds for the weigh bucket to reach a stable state.
6. Press the enter key. The display will go to live mode and should display 1000.0 grams.
7. Repeat process for all addition weigh buckets that require calibration.
8. Return to the main menu and perform the "Zero" procedure.

Note: Be sure that there is no air flow around the machine. Fans and heat vents will affect accuracy.

### 6.4 System Setting

## 1. Menu for system settings

Enter the "System setting" from the Main Menu and enter Password 2 when prompted.


Illustration 6-4-1

## 2. Date Setting

Enter Day, month, and year on the keyboard. Move the cursor using the arrow key.
3. Time Setting

Enter the correct time directly through the digital key.
4. Collect - Collection Bucket - This item is optional and needs to be turned on or off. 0 means there is no collection bucket. And 1 means there is a collection bucket.

## 5. Optimize Times

The system will search pass combination to Optimize times and pick up the best accuracy. It can keep good accuracy. Its range is 1-20. The recommend value is 12 .

## 6. Accuracy Times

When the system can't find a good combination, it will enforce the bucket to combine. For Example, the accuracy times is 2 , and the weight requirement is $100 \pm 1$. If the system can't find an acceptable combination, the system will increase the accuracy as that setting to be $100 \pm 2$ to search the pass combination. If the system still can't find an acceptable combination, it will continue to increase the acceptable range to be $100 \pm 4$. This process will
repeat until an acceptable range is found.
7. Enforced Combining bucket quantity

This value controls the pass rate. If this value is small, the pass rate will be lower. Its recommended value is 7 .
10.Password 1 Setting

Enter the new 6 bit new password one time. This password allows access to the program settings and Calibration.

## 11.LAMP

We can set 0, 1-99 (unit: minute) for the apheliotropic light to control the touch screen: " 0 " means the apheliotropic light is always on; "1-99" means the light will be kept on for that period of time. When the apheliotropic light is off, we may turn it on again by touching the screen.
12. Touch screen Calibration

If the touch screen doesn't receive the correct instruction, do a Touch screen calibration to amend it. Enter the Password"ABCDEF" "ENT" to enter the calibration menu, Like Pic6-4-2, 6-4-3, 6-4-4. Follow the onscreen instructions as shown below.


Illustration 6-4-2

# Second step of screen calibration <br> Touch red point 

Illustration 6-4-3


Illustration 6-4-4

## 13. Required signal way

The multihead weigher accepts 4 required signal ways from 0-3. Like the Pic 6-4-5.
0 : Impulse recording: Discharge requirement signal is impulse signal, even if the machine is not ready, but system will record those requirement signals. When the impulse comes down from 1 to 0 , it is valid.

1: Impulse non-recording: Discharge requirement signal is impulse signal. If the machine is not ready, the system will refuse those requirement signals. When the impulse comes down from 1 to 0 , it is valid.

2: Level Recording, Discharge Requirement signal is level signal. Even if the machine is not ready to drop the product, system will record those requirements. When the level is going up from 0 to 1 , it is Valid.

3: Level non-Recording, Discharge Requirement signal is level signal. If the machine is not ready to drop the product, system will refuse those requirements. When the level is going up from 0 to 1 , it is Valid.


Illustration 6-4-5
14. Filter coefficient, its range is from 1-12. If the value is big, the weighing data is better, but action is slower. Press " $\leftarrow, " \rightarrow$ " to select load cell. The first data tells the value of filter Coefficient. The coming data shows which load cell is selected. Press to "Back Space" to clear past value and enter new information. Confirm by pressing "ENT" to change the Filter Coefficient. If success, it will show "OK"

Filter coefficient is the times that A/D card sample the weight data from load cell. If the times is more, its result is closer to the real weight. But A/D Card spends more time on the sampling. Its recommend value is 4-6.

## 15. Motor setting of Feeding bucket

That sets each step of the motor running speed.
16. Motor setting of Weighing bucket

That sets each step of the motor running speed.
17. Motor setting of collection bucket

That sets each step of the motor running speed.
18.Like Pic6-4-6 , 6-4-7, 6-4-8 for the motor setting menu. The value is more, the speed is lower. There are 4 models preset in system to be used. Holding door means how long the bucket will remain open, unit are measured in MS..

## 19. Password 2 Setting

Enter the new 6 bit new password one time. This password allows access to the system settings.


Illustration 6-4-5


Illustration 6-4-6


Illustration 6-4-7


Illustration 6-4-8

## 7. Signal wire :

| Function | Label | Color | Label | Color |
| :--- | :--- | :--- | :--- | :--- |
| OK to Dump | IN1A | Brown | IN1B | Red |
| Infeed Signal | OUT1A | Brown | OUT1B | Blue |
| Cycle Bagger Signal | OUT2A | Green | OUT2B | Blue |
| Overweight Signal | OUT3A | Purple | OUT3B | Gray |
| Additional Ready | OUT4A | White | OUT4B | Black |

1.1.Explanation: Team $A$ signal and Team $B$ signal

OK to Dump: Signal from auxiliary equipment (bagger) stating it is ready to accept one discharge.

Infeed Signal: Output to infeed system for start and stop of feed.
Cycle Bagger Signal: Signal to auxiliary equipment (bagger) that scale has discharged and to bring in an empty container.

Overweight Signal: A signal that the scale has dropped a combination that is out of range.

Additional Ready: The Multihead weigher has additional combinations ready. The output is continuous if system is always ready for the next discharge.
2. Working operation: All the wire labeling "OUT" is the multihead weigher output the signal. And Labeling "IN" is receiving signal port.

## Direct current for the connection signal with other equipment (Packing machine, conveyor, etc.), should be no more than 30 V , load current no more than 100 mA .

## 8 . Maintenance

In order to keep machine running well, make full use of the machine, the daily maintenance
should be done every week. But before checking the machine, the power supply should be turned off. All operators must be trained through Expert course.

1. Before running the machine, be sure that no foreign objects are hanging from the weigh bucket hooks.
2. Add edible oil on the joint of bucket every week to keep the bucket running smoothly.
3. Clean the dust on the machine every two months.

## 9 . Transportation, Storage

1. Be careful during transportation, load and unload.
2. Vibrators should be kept in a temperature between $-10^{\circ} \mathrm{C} \sim 40^{\circ} \mathrm{C}$, and a relative humidity less than $\mathbf{9 0 \%}$.

## 10 . Open Crate and Examination

1. Open the crate from the top board, then, remove side board. It is helpful to protect machine face.

## 11. Electric wiring diagram




