

**ROTARY  
HARROWS**

**SEED  
CLEANERS**

**CROP  
DRYERS**

**PHOENIX ROTARY EQUIPMENT LTD.**



**PHOENIX<sup>®</sup>**

# **Owner's Manual**

**INNOVATORS FOR THE MILLENNIUM**

# PHOENIX MAXI-CLEANER

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## WARRANTY POLICY

Dear Purchaser

The technology relating to the design and operation of the "Phoenix Maxi-Cleaner" is relatively new, therefore factors effecting successful operation of this equipment are not well known in general farming industry.

Our warranty conditions are aimed to impressing on our dealers and purchasers/clients the need to pay special attention to certain factors that are necessary to guarantee successful and reliable use of this equipment.

Please read our instructions carefully and contact Phoenix Rotary Equipment if you do not fully understand our instructions.

**"Phoenix Rotary Equipment Ltd" (PRE)** warrants to the purchaser that in normal use, if any part of goods manufactured is proven to be of defective material, such part will be replaced or repaired, if returned to a dealer nominated by "PRE" or to the dealer from which the goods were purchased at cost of purchaser within twelve months of delivery of the goods, but such warranty shall be to the extent permissible by law, cease to apply forthwith if goods are misused or used contrary to recommendations of "PRE".

The purchaser agrees the "PRE" and/or "PRE" nominated dealers shall not be liable for any claim for damages due to loss of time in use of goods or loss of profits due to defective goods or any other consequential damages whatsoever except to the extent that such exclusion of liability is prohibited by law

All failures must be reported immediately by the purchaser Phoenix Rotary Equipment.

The only parts that would be replaced or repaired under warranty are those that are proven to be of defective material by persons in authority in the "PRE" Customer Service Department.

It is the policy of "PRE" to continually strive to improve their products whenever possible.

Therefore "PRE" reserves the right at all times to modify its products or parts without notification and undertakes no liability to modify products sold, to conform to any such modifications.

Travelling and kilometer charges are not accepted by "PRE" and will be charged to the purchaser, as "PRE" has no control where equipment is sold.

All pre-delivery checks must be done by "PRE" or the "PRE" appointed dealer and signed by the dealer and purchaser when completed on the Warranty Registration Card.

## INTRODUCTION

The Phoenix Maxi Cleaner is a rotary cleaner consisting of four stages.

### The First Stage: The Scalper Unit

The Cleaner is equipped with a scalping unit prior to the actual separation. The scalping unit is situated below the feed hopper and removes material larger than crop seed before it is fed into the separating system. Scalpings and small objects such as stones and lumps of dirt fall over the front of the scalper screen and begin the fall into the waste section. The grain, having passed through the scalper, now consisting of both light and heavy grain, passes through a narrow opening which causes the grain to flow in a wide, narrow, steady curtain of grain falling in front of the air blast from the fan

### The Second Stage: The Fan and the Air Chamber

The second stage involves a fan that is able to adjust the angle of the air blast and also increase or decrease the amount of air, which together with the use of an adjustable buffer plate inside the air chamber has the ability to do an excellent cleaning job.

The grain, having passed through the narrow opening (mentioned in stage one) presents itself in such a manner to the air blast that an extremely effective separation of light grain from the heavy grain takes place.

The buffer plate can be raised or lowered which allows more or less light grain and weed seeds to be blown over the buffer plate and into the waste section.

The changing of the angle of approach of the air blast from the fan - together with the change of the velocity of the air blast; when used in conjunction with the adjustable buffer plate is very significant. The combination gives you an almost unlimited scope for separating light grain and weed seeds from the heavy grain.

It can also be shut off completely and not used at all.

### The Third Stage: Rotary Screens

The third stage is the rotary screen process. This puts the grain through four rotary screens two meters in length. These screens are fitted with a series of agitating spirals that enhance the capacity and cleaning ability of the screens. The screens are self-cleaning units that do not require ball cleaning. A nylon scraper rides over the top of the rotary screens and cleans while the screens are rotating. These screens are easily interchanged when different grains are being cleaned. At the end of this stage, clean grain can be removed from the Phoenix Maxi Clean or by diverting the grain, it continues onto the fourth stage.

### The Fourth Stage: Indent Cylinders

The fourth stage is a series of four indent cylinders. Adjustable auger troughs, variable speed and controlled material input make the indent section of the cleaner very efficient. The indent screens are easily interchangeable for different grain. When cleaning small seeds like canola the Phoenix Maxi Clean has a very useful feature. While cleaning canola Stage One and Stage Two of the cleaning process are used in the normal way. In Stage Three the rotary screens are used in a reverse way. Canola, being so small falls through the screen slots and is now in the waste auger at the bottom of the screens.

By simply engaging a grain deflector gate that is inside the front divertor box - the clean canola that is in the waste auger is now deflected into the clean grain section of the front divertor box. The waste comes out in the back divertor box. The Phoenix Maxi Clean standard model has a 25hp gas motor that drives a 27 gal/min hydraulic pump. The operator has the ability through a control center to adjust speeds on the fan, screens, indents, and the grain augers. The 25hp motor is extremely efficient using only forty-four liters of fuel every eight hours of use. The control center is mounted in the hydraulic system where precise adjustments can be made when needed.

A multi tachometer comes with the Phoenix Maxi Clean. This enables shaft speeds to be monitored. The operator has the ability to adjust speed at any time through the control center.

At any time, the fan speed can be increased or decreased simply by turning a small knob on the control panel. The tachometer will give you an immediate read-out of the new fan speed. The fan can also be turned off completely.

At any time the screen speed can be increased or decreased as described above. The screens should never be turned off while grain is being cleaned.

At any time the indent cylinders speed can be increased or decreased as described above. The indent cylinders can also be turned off completely when not being used.

Three cross augers are at the bottom of the cleaner. Two are for clean grain (one at the front of the machine if the indents are being used and one at the back of the machine if only the top rotary screens are being used). The third cross auger is for the collection of screening tailings (weed seed and thin). The speed of the three cross augers can be adjusted at any time. This machine is also equipped with a swing away auger that fits under the screening cross auger. This allows the weed seeds and thin to be put in a wagon or truck. Chemical treaters can be mounted on this model, as can bagging facilities off the cross augers. The speed of the swing away auger can be adjusted at any time. This machine comes with one set of screens that would be good for one variety of grain. This machine also comes with one set of indent screens that would be good for some different varieties of grain. The machine can clean up to 1400 bushels per hour when using just the top rotary screens. If using the top screens and also the indents, the tonnage would be cut back to approximately 500 bushels per hour. We have a Phoenix Maxi Clean that is half the size of our full model. This has capabilities of up to seven hundred bushels per hour when going through the upper rotary screens and up to three hundred bushels per hour when diverted through the indent cylinders. This machine is equipped the same as the full model, but only half the size.

## **STEPS IN OPERATION WHEN USING ROTARY SCREENS**

1. Feed in auger **must be** in the exact center of feed in hopper.
2. Screens must **never** be turned off when operating.
3. Adjust the controls to minimum setting.
4. Select and properly insert screens.
5. Start the machine.
6. Open the feed gate slightly.
7. Check action of seeds on the screens.
8. Check scalper to ensure that good grain is not going to screening.
9. Increase air until all but the desired chaff are being lifted.
10. Increase seed flow.
11. Check the finished product.
12. Check the wind tailings.
13. Check the screen tailings.
14. Pick over a sample of cleaned seed after each thirty to forty bushels.
15. Check if desired separation is being made.
16. To stop the machine:
  - (a) close the feed gate,
  - (b) wait until the machine is clear of seeds,
  - (c) stop the system by closing main hydraulic valve.

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**STEPS IN OPERATION OF INDENT CYLINDERS**

1. Start the machine and check the cylinder speed. You should start at 45rpm.
2. Open the feed gate until the machine is operating to capacity.
3. Adjust the center trough for proper separation.
4. Check the finished product.
5. Inspect the tailing.
8. Reset the center trough if required.
9. Close the feed gate and allow the machine to clear itself before stopping.

## OPERATION OF MAXI-CLEANER

1. Under normal cleaning conditions, you would run Rotary Screens at 50rpm or 47 to 50 or 50 to 53, depending on what you are cleaning.
2. Bottom Indent Cylinders should be started at 42rpm and lowered accordingly.
3. If you run outside these perimeters, the Cleaner may not run properly.
4. There would be times that you will run outside of these perimeters if you were sizing barley that had to be plumped by thirty percent. Then you would most likely run upper screens much higher than 50rpm - more than likely run at or in or about 70rpm depending on variety of grain. Adjusting feed volume is crucial when doing this. Running at this speed debards the barley.
5. When adjusting the machine, always adjust in moderation. 2rpm could make a total difference in the cleaning job.
6. The fan speed can be run at a range of 800 to 2000rpm's depending on what is needed.
7. Jacking the machine up or down may help the cleaner do a better job of cleaning, depending on the grain variety and whether the indents are being used or not.



**1A****Cleaning Red Wheat / Eston Lentils**

Using Model M4

**Scalper**

The scalper is a series of four rotary screens. Suggested scalping screens to try on most crops is the 15/64 round. This screen should effectively remove larger than seed grain materials, such as straw, and leaves, pods and larger weed seed like as Canadian thistle.

To set the scalper, go to the control centre and find the control valve marked SCALPER. Turn the knob counter clockwise to increase rpms. Start off very slowly and pick up speed once the desired feed has been achieved. Because the scalper must be set by eye sight, you must physically go up the ladder and look into the scalping area to ensure that good grain is not going over the screen into the screenings (only the garbage should be going into the screenings). If this occurs slow the scalping screen down or cut back on your feed 15 rpm is a good start speed.

**Fan and Buffer Plate**

Go to the control centre, find the control valve marked FAN and turn it counter clockwise. Start out at about 1500 rpm depending on the weight of the grain and the weight of the material that you are trying to remove. Raise air-blast accordingly. The odd good kernel should be blown over the buffer plate.

The buffer plate can be adjusted up or down it is marked on the clean grains side of the fan. For best results leave buffer plate up all of the way. To achieve the best cleaning results the odd good kernel should be blowing over the buffer plate.

The fan and buffer plate combination should remove broken and cracked kernels, light chaff and weed seeds.

**Rotary Grading Screens (A Series of Eight Screens)**

A combination of 6/64 screens in the front and a set of 5.5/64 in the back of the machine would be an effective way to clean plump red wheat, red lentils, estons or other grains of the same widths. The 6/64 screens effectively and aggressively removes buckwheat and some weeds of the same size. Whereas, the 5.5/64 will maintain some of the smaller grain seeds that would make good seed.

If you were cleaning for export you would use the scalper wind and screens. You should achieve up to 800 bushel per hour (bph); however, cleaning for seed will be closer to 400bph because the indent cylinders will have to be used. They are located just below the screens. There is a control flap at the back of the machine, which is marked INDENT. When cleaning for export the clean grain will come out of the auger at the back of the machine; however, when cleaning for seed the grain will travel forward through the indent - landing in the indent pockets. The indent pockets are turning inside the drum, lifting the seed by centrifugal force. The seed goes into a centre trough with an auger in the centre which moves clean grain forward. If a 19/64 indent pocket is used it will lift wheat or grains similar in length into the clean grain troughs.

In order to set the indents, go to the control centre. Start the indents at 42rpm by turning the control valve counter clockwise. Set the indent trough so it is level. If there are wild oats or barley in the clean sample either slow the rpm speed down from 42 to 40 or 37 rpm (but do this very gradually - 1rpm at a time) **1rpm can change the sample radically - so go slow!** Raise the indent trough. This can be done by going to the clean grain side of the machine and using the hand crank to adjust the troughs this will adjust all troughs at once. Raise the trough in moderation and give at least five minutes to see a change in the sample. If running at lower rpm, adjust your indents inwards gradually. At low speeds (such as 35 to 37rpm) there is a better chance of picking heavy grain seeds out of the screenings because they are more likely to drop at a lower point than the rest of the grain within the indent cylinder. Thus, running at low speed coupled with the trough cranked inwards will lift more grain; however, if contaminates start to get in the clean sample crank the indent outward.

All products going to the screenings will come out of the bottom of the indent cylinder and into a cross auger located at the front end of the indent. This will be transferred to the screening auger with all screenings from wind and screens gathering into this same auger. The clean grain will gather into the auger directly in front of the indent cylinder trough.

The indent is equipped with a spring loaded brush located on the upper side of the trough on the inside of the indent cylinder. This brush will help keep trash from lifting into the clean grain. For example, some wild oats have fine hair on the outside that curls around clean grain. The brush will knock off the oats and send them down the bottom of the indent cylinder and into the screenings.

	Scalper	Grading	Indent
DURUM WHEAT	17/64	6/64 + 5.5/64	22/64
RED WHEAT	15/64	5.5/64	19/64
CBS WHEAT	17/64	6/64 + 5.5/64	22/64
WINTER WHEAT	17/64	6/64 + 5.5/64	22/64
Barley	19/64 or 22/64	6/64 + 5.5/64	24/64
Oats	9/64 Slotted	5/64	40/64
Laird lentils	19/64	5.5/64 + 15/64 round	22/64
Rich-lea lentils	17/64	5.5/64	19/64
Eston lentils	15/64	5/64 + 10/64 Round	19/64
Red lentils	15/64	5/64 + 10/64 round	19/64
Field peas	22/64	11/64	nil
B90 Chick Peas	24/64	11/64	nil
Kabully chick	30/64	15/64 Slotted	nil
Canola	9/64 or 8/64 or 7/64	3/64	9/64
Flax	4.5/64 slotted	6/64 round	7/64
Canary	5/64 slotted	3/64	9/64
Sunflower (confec)	28/64 round	20/64 round	nil
Sunflower (oil)	24/64 round	15/64 round	nil

### Swing Away Auger

The speed of the auger can be set by going to the control center and adjusting the valve that has FRONT AUGER marked on it. Turn the knob counter clockwise until desired speed is achieved. The control center has a valve at the bottom that is marked SWING AWAY AUGER. Turn this valve counter clockwise, adjusting the swing away screenings auger, which can be set by eye. If it is not taking grain away fast enough, speed it up. There is a valve marked BACK AUGER. Turn counter clockwise and this will engage the back auger. This auger is used when the screens are in use and the indents are not. The back auger will carry clean grain, with the screenings still gathering at the front.

When cleaning for export - raise the front end of the cleaner up. The cleaner will increase cleaning speed. Lowering the front end will increase cleaning aggressiveness. For export, lifting the front end of the cleaner is usually normal. For seed quality lowering the front end may make the grain run through the indent faster. Running about level will create more lifting action in the indent.



## **SIZING BARLEY**

When sizing grain, you use the top rotary screens only.

*What can I do if there are too many plump kernels going into the screenings?*

Check and make sure you have the correct screen size in the machine. Then check the if the feed flow is going in too fast or to slow. Adjust your screen angle by jacking up or lowering the machine.

Adjust the rotary screen speed faster or slower. This also applies when you cannot get the kernels plump enough. The longer the grain is in the machine, the more you will clean out. Try and stay within proper RPM perimeters.

The faster you feed the less plump you will get the grain the slower you feed the plumper you will get the grain.

## Trouble shooting

### What is the purpose of the Upper Rotary Screens?

The upper screens are used for cleaning out weed seeds and smaller grains that are mixed up with the grain that you are cleaning. For example, getting red wheat out of barley or red wheat out of durum. The screens also clean out some wild oats

The upper screens are used for sizing all types of grain. The screens also help debeard barley while sizing it. These rollers also size while cleaning for seed giving uniform kernels that would make the seeding process more efficient.

#### 1. What is the purpose of the Indent Rollers?

The indent roller would be used to remove wild oats, buckwheat, whitecaps and foreign material that would be longer than the kernel.

#### 2. What is the purpose of the Upper Fan?

The fan is used to remove light material like straw chaff hulls plus light white caps.

#### 3. How do the Indents work?

The grain enters the back end of the indent roller from the upper screens through the back diverters. The grain rolls around in the indent that has drilled holes that catch the good kernels and flips them up into the adjustable auger that runs through the center of indents leaving wild oats or buck wheat rolling around and out, of indent into screening auger.

Indents are based on centrifugal force. The speed and angle of the center auger would be crucial to how clean the grain will be. Indents work on the basis of kernel length, opposite to rotary screens that work on the width of machine.

#### 4. What can I do if there is too much good grain going out with the screenings when using the Indents?

To get the best results, jack up the front end of Cleaner until there is no more good kernels coming out, slow down or speed up indents or cut back on feed volume.

#### 5. What can I do if there are wild oats going in with good kernels when using Indents?

You can adjust your center auger using the attached coupler until you have it fine tuned to the point where there would be no more wild oats in with good kernels by adjusting left or right.

#### 6. What does it mean when grain is coming out everywhere except where it should be?

When this happens, you are over feeding the machine

7. Can I use the same rotary screens for all varieties of grain?

No, you cannot use the same screens for all varieties of grain. The screens must be small enough or big enough to hold in the good kernels allowing weed seeds and thin kernels to fall through into screening hopper. (Some screens may work for more than one variety depending on kernel similarity).

For example: Durum wheat and barley would be the same kernel size. Therefore you could use the same screens.

7. **Can I clean the machine out when changing varieties?**

Yes. All augers are equipped with a drop out bottom allowing you to clean your augers out. To clean out indents, you just undo the attached couplers, turn the augers upside down and spin out indents.

8. **Can I clean different grain varieties at the same capacity?**

You will find that each bin of grain that you clean will have a different capacity depending on variety, how dirty it is and the bulk of the grain.

For example: A six row barley will be bulkier than a two row variety. Therefore the two row will go through the machine faster. An oilseed variety will go through faster than wheat.

9. **What can I do if too much good grain is coming out of the end of the scalper?**

Slow the scalper down or cut back your feed.

10. **What can I do if I cannot remove enough straw or thistle when using the scalper?**

Speed the scalper up until you have the odd good kernel going to the screenings.

### **General- Fan Assembly**

Bolts should be checked for tightness after ten hours of operation and periodically thereafter. The bearings are permanently sealed and need no maintenance.

### **Cleaning Fan Blades**

The only routine cleaning that may be required is the cleaning of the fan and the main beam assembly. This will only be required if there is a built-up of dirt or insects on the fan blades or on the inside of the beam assembly.

To clean the fan blades, remove the Air Reel safety screens. Do this by unscrewing the capscrews that secure them.

The fan blades can be cleaned with a high pressure water hose. Be careful that you do not bend the fan blades.

### **Fan Assembly Section Replacement**

Remove the safety screen.

There are eight ¼" x 1" UNC Allen head screws that hold the fan assembly to the shaft.

Remove these and pull the two halves of the fan assembly off the shaft.

Place the two halves of the new fan assembly on the shaft. Screw four allen head (or hex head) machine screws in one side of the fan assembly and pull up snug. Put in the other four machine screws. Make sure the fan assembly is centered between the brackets.

There should be about 10 - 15 mm between each end of the fan assembly and the bracket. Tighten the machine screws.

Attach the two halves on the shaft loosely with the Cap Screws provided and a 3/16" Allen Key. Make sure the shaft is clean where they bolt on. Push the two middle pairs against the dimples in the blades and locate so the ends have equal clearance, tighten the cap screws so the hubs grip. Locate the two end pairs 100mm from the end of the blades and tighten till they grip.

Tension to 14NM = 125 inch pounds, tension all four cap screws that you can see from one side with an inch/pound (Newton Metre) Tension Wrench. You will need a straight 3/16" Allen Key and a 3/16" socket on the Tension Wrench. Rotate 180 degrees and tension the other four cap screws to the same tension. Replace the safety screen.



### **Hydraulic Motor Replacement on the Fan**

Disconnect the hydraulics. Remove the two 3/8" x 1 1/2" bolts and take the hydraulic motor off. Put on the new motor making sure the shaft on the motor fits snugly and properly into the motor/shaft coupler. The motor shaft should be lightly greased. Put the bolts back in and tighten. Reconnect the hydraulics

## **SCREEN AND INDENT INSTALLATION**

The Phoenix Maxi Cleaner can be split in half to make screen and indent installation more efficient. When changing screens, simply lift screen scrapers, unfasten three clips on the screen and pull out the eight screens. Once the screens are removed, install new ones putting the front screens in first. The front screens are put in first as they have to be put in under the fan and scalping unit. (Ensure the screens are put in so the scrapers do not catch on the clip divider when screens are rotating). Scalping screens are installed the same way.

To install the indents simply remove hammer cams bar, unfasten three clips and pull the indent out. Install the new indent, refasten the three clips and put the cam back in.

Model M4 has four rotary scalping screens, eight rotary grading screens and eight indent screens.

Model M2 has two rotary scalping screens, four rotary grading screens and four indent screens.

## HYDRAULICS

The Phoenix Maxi Cleaner is equipped with a supply and demand hydraulic system power driver with a 25 HP gas engine or a diesel engine as a option .

The system is equipped with a flow controller that allows the most precise adjustment, coupled with a multi tachometer to gauge rpm levels. This would be the control center of the operation. Esso N22 would be a recommended oil for all seasons.

## **TRANSPORT**

The top hopper for feed can be folded down for transport using a winch that is equipped with the unit. Ensure that all auger troughs are closed and swing away auger is folded in and is sitting securely in the side saddle.



### **SWING AWAY AUGER**

The Phoenix Maxi Cleaner is equipped with a swing away 6" auger that simply folds out and can be put under the screenings auger on the machine. This can be used to put the screenings into a truck.

The swing away auger can be removed if desired by detaching it from the swing away arm and releasing the quick coupler hydraulics.

## **GENERAL MAINTENANCE**

The Phoenix Maxi Cleaner is equipped with sealed bearings that could be greased every 1500 to 3000 hours.

If over greasing occurs, the possibility of blowing out the seal is great. There is grease available through Phoenix Rotary Equipment Ltd. SKF LGMT 2/0.4 would be recommended.

There are ten bearings located at the back of the machine coupled with ten at the front of the machine. There are two bearings on the fan assembly, one on each side of the machine. The three cross augers have a bearing on each side being a total of six bearings.

To gain access to the bearings inside the indents, the galvanized tubes have to be unclipped and opened up. There are two bearings per indent, one on each side of the center augers.

Lubricate indent adjustment crank with WD40 once in a while to ensure easy indent adjustment.

Indent Number	Will Lift	Will Reject
2	Small Pigweed, Alsike Clover, Small Dodder, Millenweed, Sand, etc.	Buckhorn, Timothy, Black Medic Clover, Bluegrass (all varieties), Alfalfa, Crimson Clover, Lespedeza, etc.
3	Small Sweet Clover, Pigweed, Dodder, White Clover, Alsike, etc.	Thistles, Buckhorn, Sticks, Alfalfa, Red Clover, etc.
4	Timothy, Small Clover (Red & White), Dodder, Hulled Water Grass, Mustard, Sheep Sorrel.	Canada Thistle, Quackgrass, Sticks, Alfalfa, Bluegrass, etc.
5	Red Clover, Alfalfa, Small Flax, Water Grass, Mustard, Bluegrass, etc.	Meadow Fescue, Wild Brome, Large Buckhorn, Quackgrass, Cheat, Chess, Sticks, etc.
6 ½	Small Broken Grain, Small Wild Buckwheat, Small Vetch & Cockly, Wild Mustard	Fescue, Wheat, Ryegrass, Wheat Grass, Hulled Orchard Grass, Flax, etc.
8 ½	Buckwheat, Cockle, Vetch, Sudangrass, Small Sugar Beet Seed, etc.	Wheat, Rye, Fescue, Rye-grass, Orchard Grass, etc.

Source: University of Alberta

Indent Number	Will Lift	Will Reject
11	Broken Grain, Vetch, Small Onion and Garlic, Wild Peas, Coffee Weed, etc.	Spring Wheat, Rye, Rice, Alta Fescue
13	Spring Wheat, Small or Broken Durum, Pearled and Broken Barley, Flax	Durum, Large Spring Wheat, Barley, Pin Oats
19	Spring Wheat, Small Durum	Oats, Wild Oats, Barley, etc.
22	Wheat, Winter Wheat, Hulled Oats, Rye, etc.	Oats, Wild Oats
24	Barley	Oats, Wild Oats, Barley with tails, etc.
26		
28	Used primarily in length grading of Seed Corn and similar sized material.	
32		
S-3	Equal to #22 Indent but has flat bottom used primarily on Corn.	

Source: University of Alberta