

# SERVICE MANUAL

## FOR YOUR

## SUPER 49BD



*Grain, Seed and Bean Cleaners*

1440 SOUTH ADAMS STREET BLUFFTON, INDIANA 46714 (800) 248-8318  
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[www.atferrell.com](http://www.atferrell.com)

# OPERATION MANUAL FOR CLIPPER 40 SERIES

We cannot possibly answer all questions about the operation of CLIPPER CLEANERS in this manual. We will try to give you basic information on the installation of your cleaner, various adjustments for greater efficiency and a list of screen suggestions for top performance from your cleaner.

There is nothing complex about the operation of a good seed or grain cleaner. The operator has to familiarize himself with the machine and take time to study the shapes and characteristics of the different commodities to be cleaned.

A commodity is cleaned to separate the good, marketable product from all impurities. From a mechanical point of view poor cleaning is in most cases, caused by lack of proper screens, improper use of screens or faulty regulation of the cleaner.

Perforations in the top one or two scalper screens should be just large enough to let the commodity being cleaned fall through readily and small enough to scalp off foreign material such as sticks, stems, chaff and larger seeds, or grain other than the product being cleaned. For most commodities a round hole top screen is recommended. After the scalper screen or screens has removed the objectionable foreign material larger than the commodity being cleaned, the perforation of the lower screen go to work. The bottom screen removes foreign material smaller than the product being cleaned. Any immature kernels, sand, dirt, or small weed seeds drop through the bottom screen and the good commodity passes over the bottom screen. For most commodities, an oblong sifting bottom screen is recommended.

The purpose of air separations is to remove all possible light material without waste of good grain or seed, and to control dust. Detailed instructions for regulating and controlling the air separations are given in this manual.

## LOCATION

Careful consideration must be given to selecting the proper location for the cleaner or the best results in efficiency and convenience cannot be expected. All models should be fastened to a solid, level floor or foundation. **THE ENTIRE BASE OF THE MACHINE SHOULD BE SUPPORTED. 3/4-8 grade 5 bolts are recommended.**

The cleaner should be placed with the fan discharge opening facing, and a short distance away from an outside wall. Screens are inserted and withdrawn at the front of the cleaner. Allow clearance for the operator to make screen changes. The largest single piece screen available for this series of machines are either 42"(47 Series) or 60" (49 or 498 series) long. Allow room around the cleaner for the operator to make adjustments and service the machine. Do not install spouting in a position that will interfere with the controls or maintenance.

Eventually worn parts must be replaced so allow room to pull all shafts and spouts. The cleaned grain discharges from the under side of the cleaner, so it should be placed on a floor with a pit or basement underneath so that an elevator with its receiving spout three or four feet below the floor can be used to raise the grain. If the elevator cannot be carried below the floor, and there is sufficient headroom, the cleaner may be placed on a **solid platform** high enough above the floor to allow the grain to flow into the elevator or sacking spout. Screenings and air lifting's discharge from built-in spouts in the cleaner. Provision must be made to handle this material.

The Cleaner hopper is a feeder mechanism - not a storage bin. Cleaners work best when equipped with a surge bin above the hopper to provide a steady supply of the commodity to the hopper. The grain supply to the surge hopper may be by spout from bins located on the floor above or by means of an elevator from a sink of dump hopper on the same level or lower than the cleaner. Spouts must have a fall of at least seven feet in ten to provide free flow and should be carried directly at an angle instead of making right angle jogs. **The feed hopper works best when it is feed across the width of the hopper inlet opening. If a full width feed cannot be used, an inverted y transition with a 20" distance between the spouts is the second best style. This would drop the product to each side of the hopper**

## AIR DISCHARGE

Improper air trunking installation from the cleaner and into the collector causes up to 90% of the difficulties in conjunction with improper air movement. Sharp turns, improper junctions, poor connections and poor collection equipment will all contribute to air deficiency in a cleaner. Improper air clearance also results in a very dirty, dusty plant operation. The top fans develop sufficient velocity so that cyclone-type collectors can be used to settle the dust and chaff from the air discharge of the cleaner. The following are a few of the common errors found in plants and how each can be avoided or corrected.

A separate air duct should be provided to conduct the discharge from each fan to a dust house or to the outside of the building. The area of the air duct should not be less than that of the fan discharge opening and it should be run straight, if possible, and any bends, which are necessary, should be made with a large radius. If it is really necessary to use a single duct for the discharge of both fans, this may be done providing the area of the duct is made equal to the combined areas of both fan discharge openings and also provided that the ducts from each individual fan are brought together at an angle of not more than 60 degrees to form a "Y". The two air streams should also be separated by a partition in the main duct for about two feet beyond the junction.

Refrain from installing elbows, which have a sharp change of direction. Backpressures are created at such points. In most cases, light chaff will be dropped into the pipe and finally plug the entire run. A rule of thumb used at our plant is that the inside radius of the elbow would be at least two and one half times the recommended diameters of the air pipe.

The final source of trouble is the cyclone itself. If it is either too large or too small, or isn't designed properly, or has a cap over the pipe discharging from the top of it, or in some other way causes back pressure or pressure drop, or turbulence that interferes with the cocooning action of the air inside the collector, the cleaner air system or the collector system may not function properly.

# DUST COLLECTOR

## INFORMATION TO AID IN SPECIFYING

THE AIR ROTATION DIRECTION IS SPECIFIED, AS VIEWED LOOKING DOWN FROM ABOVE.

COLLECTOR:

<u>(ROTATION)</u>	<u>CLOCKWISE (ROTATION)</u>	<u>COUNTER</u>	<u>CLOCKWISE</u>
	<u>Figure "A"</u>		<u>Figure "B"</u>

NOTE: Order using terms - clockwise and counter clockwise - only.

When planning an installation:

1. Avoid sharp bends and compound curves as they reduce the velocity and encourage back pressure.
2. Install the cyclone as near to the cleaner as possible to eliminate length of air travel and extra cost for excess ducting.

Figure "C"  
(Correct)

Figure "D"  
(Incorrect)

DO NOT CHANGE DIRECTION OF AIR TRAVEL.

## PLACING SCREENS IN CLEANER / BRUSH SCREEN CLEANING

The double travelling brushes under each screen ride in a carrier, which rolls back and forth on a brush rod. This rod must be lowered before changing screens. To lower the brushes, pull out the spring pin in the brushes adjusting lever and swing it as far as it will go away from the sector with the series of holes.

Screens may be withdrawn or replaced from the front of the machine by releasing the spring hooks which hold them, lowering the brushes and sliding the screens in or out of the slots. For machines which must be located too close to a wall to allow a full length 1 piece screen to be removed, split two-piece screens may be ordered so that one section of a screen may be removed at a time.

The screen will slide into the grooves in the shoe or rocker sides and up against the stop. Snap the screen hooks in position to lock the screen in place and raise the brushes by swinging the brush-adjusting lever back to its original position and locking it with the spring pin.

As different commodities travel at a different speed over a screen of any certain pitch, the screens are built so that the pitch of each screen can be changed to regulate the speed of travel and secure the most exact separation on that screen. The condition of the seed itself and the screen used will have to be the guide in determining what pitch to use for best results. Experiment with various adjustments to familiarize yourself with results obtained from the wide range of settings and the fine adjustment combinations.

Screens should be cleaned before storing.

## DUSTLESS

Try out the adjustment of the valves on both suction fans and note the effect on the amount of suction at the feed hopper and air lifting discharge spout. We call the valve which has its operating crank nearest the front of the cleaner (the end where the screens go in ) the front suction valve. It controls the suction in the air chamber between the hopper and the top screen. The valve with the control nearest the back of the machine is the back suction valve. If the cleaner has a bottom blast fan, the back suction serves as a booster fan. It picks up the air from the back chamber and boosts its velocity through the air piping and cyclone. If the cleaner has suction only, the back suction valve controls the back air separation and should be regulated to remove undesirable light material.

## SELECTION OF SCREENS

When selecting screens for any kind of seed or grain, it is always necessary to take into consideration the condition of the commodity and the foreign material mixed with it. It is frequently necessary to use screens that will remove a small percentage of the good commodity with the foreign material in order to make the product marketable.

It is advisable to have an assortment of our hand testing screens. By testing a handful of grain or seed before processing, you can determine in advance the exact perforation size of mesh to use and just what separation can be made with the screen, and also what will have to be done by the air. You can also determine what benefit would be derived from re-running any of the stock, which cannot be improved by any change in setting in the original run.

If you do not have the proper screens to clean a particular lot, send us a 1 POUND sample, ALONG WITH THE MODEL NUMBER OF YOUR CLEANER, and we will make a screen selection for you. We will then advise you which screen you will need and ship upon receiving your instructions to do so.

In general, the upper screen two screens (called the scalping screen) should be just large enough to allow the commodity being cleaned to pass through, removing all larger material. The lower screen (called the sifting screen) should be of the largest perforation or mesh that will hold up the food product and sift out the broken and immature kernels, sand and small weed seeds.

## PREPARING SEED FOR CLEANING

Many older seedsmen will remember that the purity of seed coming from the old time threshing operations was such that it was almost good enough to bag and tag without further cleaning.

On the other hand, seeds harvested with modern combines may contain as much as 60 to 70 percent foreign material consisting of trash, weed seeds, stems, leaves and freshly killed insects. Much of this material may be green, making the seeds difficult to handle and dangerous to plant today the first machine used is a scalper. The scalper removed the bulk of the cleaning operation can be finished. Scalper machines may consist of simple reels to remove the long straws or they may incorporate a flat screen to separate the long straws and the green material. There may also be a combination of top screens or bottom screens necessary to handle the kind of seed coming in. These machines are built with a fan if it is desirable to have an air separation while the seed is being scalped. The scalper with air takes off large foreign material.

After most of the foreign material is removed, further special processing of the commodity may be required to prepare it for final cleaning. Clipped bluegrass seed may have to go through either machine to break the seed free from the plant even before scalping. Other by removing the points of attachment, beads and excess chaff and delivering them as individual seeds ready for accurate cleaning with the finishing cleaner.

The debearder is made up of a horizontal steel drum in which stationary arms are positioned along the inside of the housing to prevent the mass of seed from swirling inside the machine, and another set of arms that turns through the seeds to finish the threshing. One function of the debearder is to break apart grass seed doubles. Another is to remove the awn and outer glume from watergrass seeds harvested with sudangrass seed. When the glumes and awns have been removed by the debearder the size of the watergrass seed is greatly reduced so that a very easy and quick separation can be made with a screen. Other uses for the debearder are the shelling of unthreshed wheat kernels commonly called "whitecaps", the debearding of barley and the removal of barley points of attachment, removing the whiskers from carrot seed, and the partial decortication of sugar beet seed. The most common use is for clipping seed oats. When seed oats are clipped by the debearder, those oats which are still wrapped in the outer glumes are detached from the glumes, double oats are separated, awns ( if the oats carry awns ) are removed, fuzzy tips of chaff on the oats will be clipped, the oats will be polished, and their test weight greatly increased. Oats thus processed can be easily very accurate separation since there will be no double or unthreshed glumes riding over the top screen into the screenings. The finished product will only be exceptionally greatly improves the test weight, the removal of the chaff, awns and other material hardly affects the actual weight of the product. This trashy material is so light that the loss of weight can hardly be measured.

Some seeds must be hulled with special hulling machinery before they are ready for cleaning; therefore, in many seed plants, seed hullers are used before the finishing cleaners.

Many kinds of legume seed carry a percentage of hard seeds making it desirable to scarify (slightly stretch the surface of the seed so that it will absorb water and germinate the first year that it is planted) the seeds either before or after the final cleaning. Some varieties of seeds will be scarified long after they have been thoroughly cleaned, since the scarification may reduce the length of time that the seeds will maintain viability in storage. Scarification in those varieties may be performed shortly before the actual plating time. Other kinds of legume seeds may require both hulling and scarification. The hulling of many kinds of grass seeds in the hulling and/or scarification of legume seeds is generally accomplished with a huller and scarifier machine, which in some manner.

## TRIAL RUN

The cleaner may now be started up and run for a short period to make sure that it is operating freely and that all parts are functioning properly. Try a few changes in adjustments to become familiar with the results obtained using different settings.

### **WARNING!**

**Do not attempt to install, connect power to operate or service this machine without proper instruction and until you have been thoroughly trained in its use by your employer.**

THE FOLLOWING ARE GENERAL GUIDELINES ONLY. YOUR SETTINGS WILL PROBABLY VARY FROM THESE

### INLET HOPPER

Open the internal hopper gate until about 1/2 to 3/4 of the top screen is covered.

### SCREEN PITCH

As different commodities travel at a different speed over a screen of any certain pitch, the screens are built so that the pitch of each screen can be changed to regulate the speed of travel and secure the most exact separation on that screen. Please remember that the longer the seed stays on the top scalping screen or screens, the less time the seed will have on the bottom sifting screen. The condition of the seed itself and the screen used will have to be the guide in determining what pitch to use for best results. Experiment with various adjustments to familiarize yourself with results

### AIR SETTINGS

Take a sample of the product coming out of the settling chamber discharge. The front air is set properly when a very small amount of good-looking seed is present in this discharge. This seed usually will be the lightest of the good seed. If there is an excess amount of good seed, close the front air valve at the hopper end of the machine until there are only a few good seeds in the top settling chamber discharge auger. Please wait 10 seconds for the adjusted setting to be discharged out the discharge. If there are no good looking seeds in the discharge, open the front air valve until a small amount of good seed appears in the settling chamber discharge auger.

## **WARNING!**

**Do not attempt to work on, clean or service this equipment or open or remove any protective cover, guard, grate or maintenance panel until the power has been turned off and locked out and the machine has come to a complete stop.**

## **HOW TO CHANGE HOPPER BRUSH (BRUSH HOPPERS ONLY)**

1. Loosen set collars on gate shaft. Loosen set screws in lever arms and pivot arm.
2. Remove gate opening indicator if shaft is removed outside opposite gate control.
3. Move shaft enough to expose Woodruff keys.
4. Remove keys, file burrs and remove shaft.
5. Remove screws from strap hinges. Pull out brush assembly.
6. Remove lever arm assemblies.
7. Remove hinged front flap.
8. Remove metal liner and hinges assembly.
9. Fasten liner, flap and lever arms to new brushes in same position as before. Install in hopper. Tighten all set screws except those in pivot arm.
10. Set adjustments screw so block is in center of threaded shaft. Pry up on gate and tighten set screws in pivot arm.

## **HOW TO CHANGE HOPPER ROLL**

1. Measure shaft location. On the drive side, remove collar and bearing from shaft and collar from drive shaft.
2. Remove clutch pulley, clutch and handle. Remove gears and collar from roll and idler shafts. Loosen gear and lock collar on drive shaft.
3. Pull drive shafts out drive end. Remove rear case. Loosen set screws in roll flanges and pull out roll shaft. Shaft has Woodruff key on drive side.
4. Remove bottom slide board.
5. Remove flanges from ends of roll. Drop roll out hopper bottom.
6. Mark location of flanges on new roll. Re-assemble by reversing above steps.

## HOW TO CHANGE ECCENTRIC SHAFT

1. Take off all belts.
2. Remove variable discs and pulleys.
3. Check and record shaft location.
4. Remove bolts fastening eccentrics and disengage from pitman arm.
5. Loosen set screws in eccentrics and disengage from pitman arm.
6. Remove bearing cap from variable bearing.
7. Remove bolts from outer and center flange bearings. Loosen lock collars.
8. Shaft with attached bearings and counterweights can be removed from either side.
9. Loosen set screws in counterweights – shaft to expose keys.
10. Remove keys, file set screw burrs, and oil shaft lightly.
11. Slide bearings, collars and counter weights off shaft opposite variable.

### CLEANER OPERATION NOTICE :

Serious trouble may be avoided by proper brush and brush carrier adjustment.

1. Brush travel and shoe oscillations are at right angles. Adjust brushes so that braces ride where there are no tufts. Conflicition here causes crowding of bristles and undue strain on the screen.
2. Never allow the brush carrier or the brushes to strike the shoe sides. This causes excessive wear on the cables, sheaves, shear pins and brush drive.
3. After adjusting brush tension, make sure that the carrier roller engage the shaft, and roll freely.

## **SHUTDOWNS ARE COSTLY!!!!!!!!!!**

**Replace parts as soon as they are worn and before they break or cause untold extra damage.**

**LUBRICATION INSTRUCTIONS**  
**FOR SUPER MODEL CLIPPER CLEANERS**

**MONTHLY UNTIL GREASE APPEARS**

**WIPE OFF EXCESS**

Hopper clutch pulley – zerk in end of shaft.  
Variable speed sliding sheaves – zerk in extension tubes.  
Hopper end bearing – zerk in extension tubes.  
Thrust bearing inside variable speed controllers.

**SEMI-ANNUALLY UNTIL GREASE OZZES OUT OF SEAL**

Do not force too much grease in these or you will break the seal which will allow the grease to run out and result in the bearing being under lubricated.

**LUBRICATE WHEN COLD**

Pillow block bearings on top fan shaft.  
Pillow block bearings on shaker shafts.  
Pillow block bearings on counter shafts.  
Pillow block bearings on brush jack.  
Flange bearings on lower shaker shaft.  
Bridgetree bearings on bottom fan shaft.  
Eccentric bearings.

**AS NEEDED –**

Brush jack cross shafts... these may squeal. If so, use spray silicone lubricant, as needed.

**NOTE :::**

**DO NOT OIL** brush jack chain or cross shafts.  
**DO NOT OIL** rope sheaves or brush carrier rollers.  
AUGER END BEARINGS REQUIRE NO LUBRICATION.  
HOPPER DRIVE SHAFT BEARINGS REQUIRE NO LUBRICATION.

## SCREEN RECOMMENDATIONS FOR CLEANING COMMON GRAINS

FERRELL-ROSS carries in stock over 150 sizes of perforated metal and wire cloth screens. Screen selections are ALL IMPORTANT as to degree of separation made and capacity obtained.

The closer the size difference between the seed size and the screen size the screen, the better are the results of removing trash, sticks, stems, ect., larger than the grain or beans being cleaned. At the same time, the capacity will decrease proportionately as smaller openings are used.

The size perforation selected for the lower sifting screen will not alter the capacity. However, it will affect the quality of the finished product. The larger the perforation, the greater will be the amount of dockage removed.

Anytime our company refers to FINE, MEDIUM OR FAST CLEANING in regard to capacities (or the job to be done), we are thinking as follows:

### FINE CLEANING

Selecting the smallest perforation of main screens that will permit the grain being cleaned to drop through and selecting weeds, dirt and inferior undersize and shrunken kernels of grain.

In fine cleaning, capacity is secondary to the quality of the finished product and grain cleaned to this degree is suitable for milling purposes providing, of course, that the grain prior to cleaning dose not contain items that, because of size and weight, cannot be removed by screens and air.

### MEDIUM CLEANING OR MARKET CLEANING

Main screens are selected to scalp off practically all sticks, stems, leaves and trash. These perforations are larger enough to permit free flow and satisfactory capacity.

Bottom sifting screens are small enough not to waste grain...still large enough to remove most dirt, small weed seeds, small green material and other dockage.

### FAST CLEANING

Main screens are selected with large openings to permit heavy, high capacity flow. They will scalp off only large objectionable sticks, stems, leaves and other large trash. Weed screens will usually be of small perforation to permit only dirty, sand and small weed seeds to be removed.