






CIRCU-LATOR

OR

DRI-FLO

OPERATING INSTRUCTIONS

	
DANGER	
	
ROTATING AUGER HAZARD	
SWEEP AUGERS CAN SUDDENLY WHIP AROUND BIN AT SPEEDS OVER 100 MPH AUGERS CAN START WITHOUT WARNING AUGERS ARE HIDDEN UNDER THE GRAIN	
To prevent serious injury or death:	
<ul style="list-style-type: none">● Disconnect and lock out power source before entering bin, operating clutches, adjusting, or servicing.● Keep bin entrances locked unless power is locked out.● Do not operate without all spouts, shields, and guards in place.	
P-11035	

PLEASE READ AND UNDERSTAND THE OPERATING INSTRUCTIONS IN THIS MANUAL AND IN THE OPERATOR'S SAFETY MANUAL BEFORE ATTEMPTING TO OPERATE.

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MODEL NUMBERS

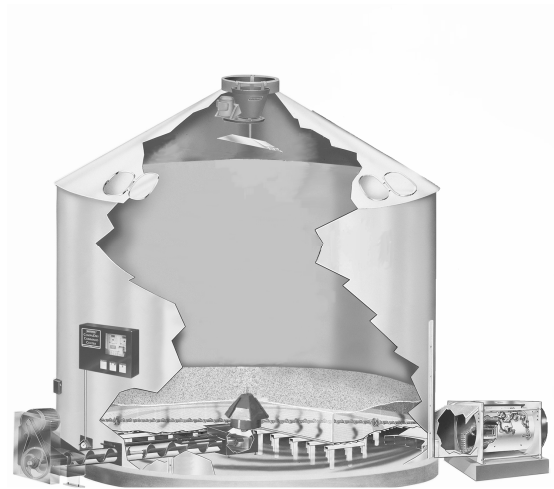
Circu-Lator

- CL6HUXX* Circu-Lator I with 6" Horizontal Unloader
- CL8HUXX* Circu-Lator I with 8" Horizontal Unloader
- CLIIHUXX* Circu-Lator II with 8" Horizontal Unloader
- RCL2HUXX* Circu-Lator II for Rice with 8" Horizontal Unloader



Dri-Flo

- DF500XX
- DF1000XX



XX = Bin Diameter 18' to 48'
(Limitations on bin diameters for some equipment. Consult factory for available sizes)

* = S, M, T for Short (16'9"), Medium (17'9"), or Tall (18'5") Center Vertical

Available options include:

- Hard Surfacing for extended wear.
- Vertical Unloaders for outside the bin to elevate grain from the Horizontal Unloader.
- Auxiliary Sweep Auger (Circ I only) to speed bin clean out.
- Intermediate Wells to unload grain other than through center well.

Consult Factory or your Shivers dealer for other options & equipment

TABLE OF CONTENTS

Introduction	1
Safety Information	2
Warranty Information	3-4
Identification of Parts - Circu-Lator	5
Identification of Parts - Dri-Flo	6
Filling the Drying Bin	7
Adjusting Recirculation Spreader	8
Start-Up Procedures	9-12
Recirculation Drying	13-15
Continuous Flow Drying	15-16
Unloading Stored Grain	16
Motor & Pulley Recommendations	17-18
Maintenance	19-25

INTRODUCTION

Shivvers Circu-Lator's and Dri-Flo's are the dry grain handling components of totally automated in-bin drying systems. They can be configured to match your needs today and can easily be expanded in the future to grow with your operation. The system works because of specially cut tapered sweep augers that take an even layer of dry grain off the bottom of the bin.

The Circu-Lator takes grain from the bottom of a drying bin with one or two tapered sweep augers and elevates it up a center vertical auger. Grain can flow out the top of the vertical auger and be spread back into the bin in a recirculation or batch-drying mode. One or more continuous flow augers can be added to transfer the dry grain to a storage bin, for a true continuous flow mode of operation. Grain movement capacities from 135 to 850 Bu/hr are possible depending on motor pulley size and number and type of sweep augers installed. Circu-Lator I's have one tapered sweep auger installed. These systems usually have a 6" center vertical auger and a 6" horizontal unloader. Circu-Lator II has 2 tapered sweep augers installed, usually with an 8" center vertical auger and an 8" horizontal unloader.

The Shivvers Dri-Flo comes with 2 tapered sweep augers and is available in two sizes, the Dri-Flo 500 and the Dri-Flo 1000. The 500 and 1000 represent the nominal capacities of the sweep augers. By utilizing different motor pulley sizes, capacities from 300 to 1200 Bu/hr can be obtained. The Dri-Flo takes grain from the bottom of the drying bin like the Circu-Lators, but then discharges the grain through a horizontal auger located under the drying floor. There is no center vertical auger used with a Dri-Flo. Dri-Flo 500 comes with a 6" horizontal unloader while the Dri-Flo 1000 comes with an 8" horizontal unloader.

SAFETY INFORMATION

Read the Shivers Operator's Safety Manual (Part # P-10001) for safety information, equipment definitions, and proper use of safety locks and disconnects. It also has location and identification of safety decals, a list of common operating manuals, and a proper bin unloading procedure. Videos are also listed in the operator's safety manual. These videos show installation and operation for various pieces of Shivers equipment.

**DO NOT FORGET!
READ THE OPERATOR'S SAFETY MANUAL!!**

WARRANTY INFORMATION

FLOORS AND FLOOR SUPPORTS:

Shivvers Floors and Floor Support structures for Circu-Lator & Dri-Flo are warranted for use with Shivvers Circulating equipment, when installed as instructed. Consult other floor manufactures for their recommendations before using Shivvers Circu-Lator or Dri-Flo. Additional supports may be required. If other brands of floors and/or supports are used, Shivvers Incorporated will not be responsible for the drying floor or floor supports should they fail. Shivvers Incorporated will not be responsible for damaged Shivvers equipment due to another manufacturer's floor and/or support failure.

BURNERS:

Shivvers recommends the use of vaporizers on all Circu-Lator & Dri-Flo installations which have propane fueled burners. Vaporizers are required for accurate moisture control in night time operation when the Circu-Lator is controlled by a grain thermostat. A safety high limit located in the grain above the burner transition is highly recommended when using other manufacturers burners. If burners other than Shivvers are used, Shivvers will not be responsible for damage caused by them.

BIN STIFFENERS:

Bin Stiffeners are required. Follow the Bin Manufacturers recommendation or use Shivvers Stiffeners. Some manufacturers are marketing heavy duty bins especially designed for recirculation type dryers and may not require stiffeners. Bins are under the bin manufacturer's warranty and are not covered under Shivvers warranty.

DOORS:

Remove the Withdrawal Auger Cover Plate which may be fastened to one of the door panels and extend into the bin. This and any other internal protrusion of substantial size (extra bulky ladders, etc.) should be removed as they could be pulled down by flowing grain during operation. All doors must be of sound construction, and all original equipment door braces must be bolted in place during operation.

SHIVVERS WARRANTY

Two Year Pro-Rated Warranty:

SHIVVERS' Circu-Lator, Dri-Flo and related equipment and accessories manufactured by SHIVVERS Manufacturing, Inc. are guaranteed under this limited warranty for the first season of harvest operation, regardless of purchase date, when installed in accordance with the applicable installation manuals, and operated as directed in the SHIVVERS "Operator's Safety Manual", the "Circu-lator or Dri-Flo Operating Instructions", the SHIVVERS "CompuDry Command Center Operating Instructions", if so equipped, and other applicable operating manuals. Under this warranty, SHIVVERS will repair or replace such parts as are returned to us and found defective.

During the second season of harvest operation, SHIVVERS will repair or replace at 50% of the retail price, such parts which are returned to us and found defective.

V-Belts are not covered by this warranty.

Electric Motors (including Spreader Motors) are under Warranty of the motor Manufacturers and are not covered by the SHIVVERS Warranty. Warranty for motors must be handled through an authorized motor service center for that Manufacturer.

SHIVVERS makes no Warranty of any kind, expressed or implied, except as stated herein and buyer assumes all risk and liability resulting from the use of products manufactured by SHIVVERS, whether used singly or in combination with other products.

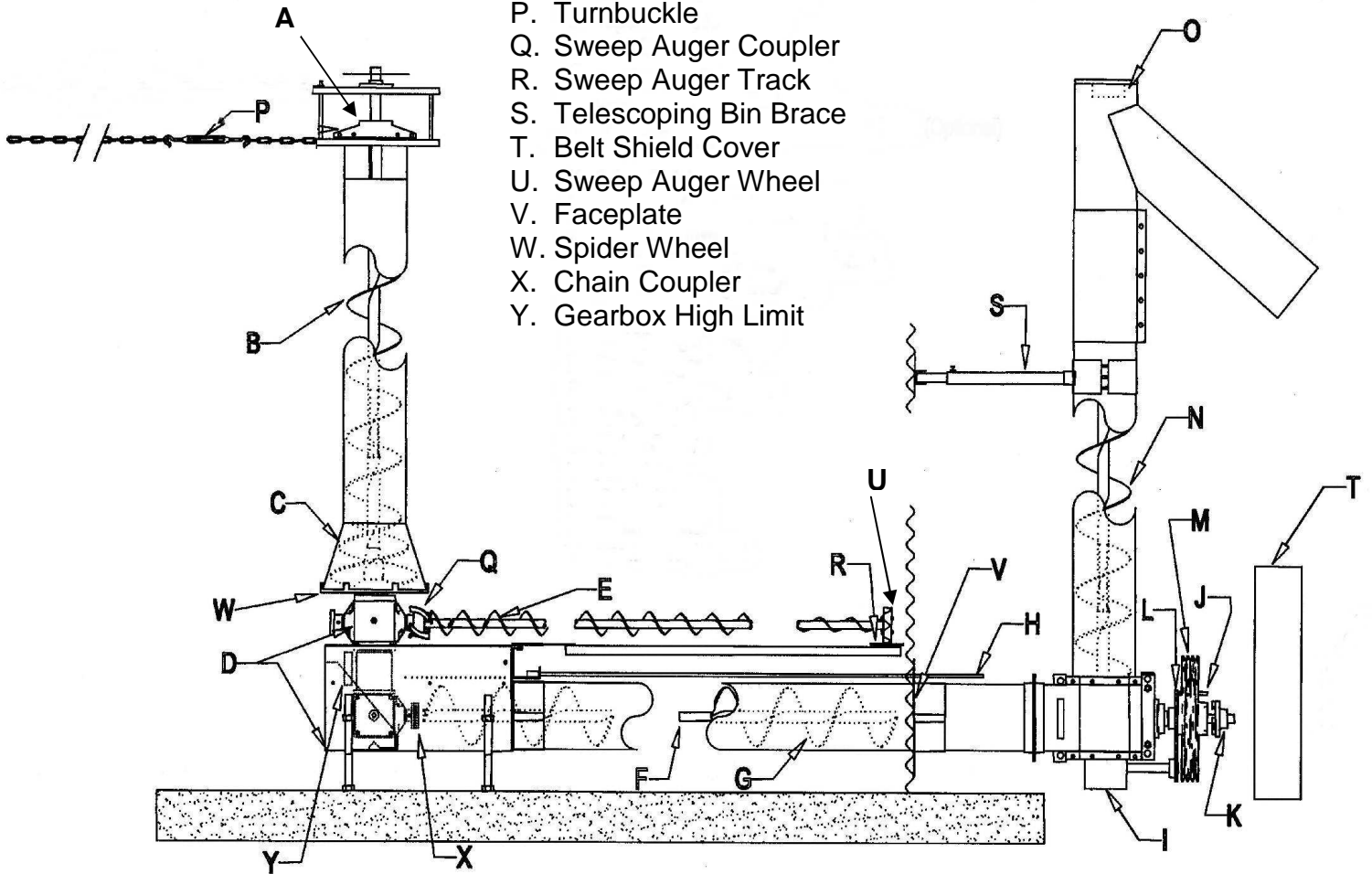
ATTENTION:

Circu-Lator and Dri-Flo will set up flow patterns of grain which exert extra stress on the walls and floor of your bin. Additional floor supports are required for your drying floor. Bin-side wall stiffeners are required. You should consult the bin and floor Manufacturers for their recommendations before using Circu-Lator or Dri-Flo. SHIVVERS will not be responsible for structural failure of your drying floor or bin, or for any loss, damage or injury relating to use of Circu-Lator or Dri-Flo.

For purposes of this Warranty, "Season of Harvest" is defined as the period of time between June 1st and December 31st of a calendar year.

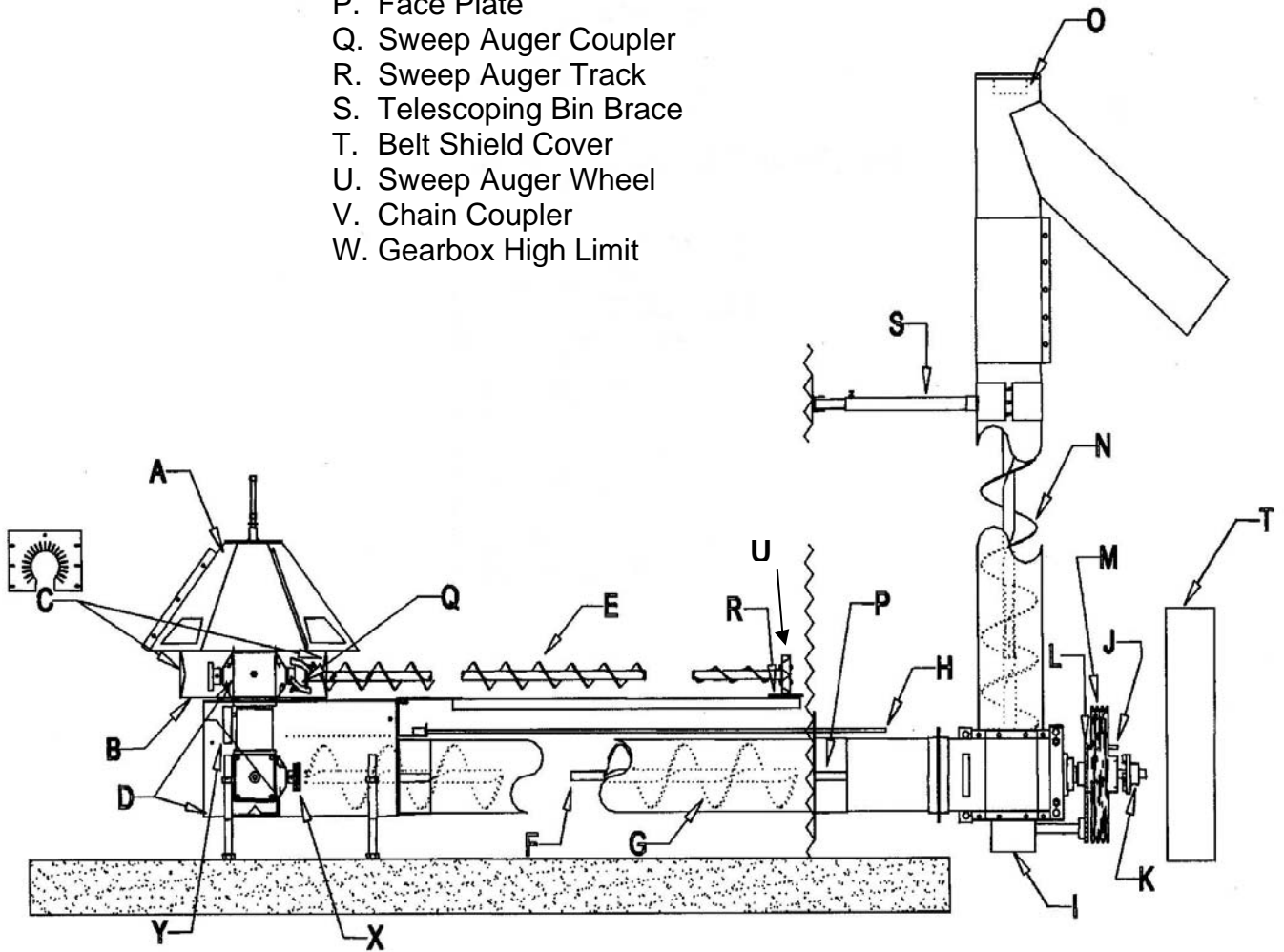
IDENTIFICATION OF PARTS-CIRCU-LATOR

- A. Recirculation Spreader
- B. Center Vertical Auger
- C. Pickup Finger Assembly
- D. Basket/Gearbox Assembly
- E. Tapered Sweep Auger
- F. Drive Shaft
- G. Horizontal Discharge Auger
- H. Slide Gate Control Rod
- I. Vertical Discharge Gearbox Bottom Drive (Optional)
- J. Unload Clutch Pin
- K. 3 Jaw Clutch
- L. Discharge Auger Drive Sprocket
- M. 3 Groove Drive Pulley Wheel
- N. Vertical Drive Auger (Optional)
- O. Vertical Discharge Bearing
- P. Turnbuckle
- Q. Sweep Auger Coupler
- R. Sweep Auger Track
- S. Telescoping Bin Brace
- T. Belt Shield Cover
- U. Sweep Auger Wheel
- V. Faceplate
- W. Spider Wheel
- X. Chain Coupler
- Y. Gearbox High Limit



IDENTIFICATION OF PARTS-DRI-FLO

- A. Dri-Flo Bonnet
- B. Metering Ring Assembly
- C. Wear Liner
- D. Basket/Gearbox Assembly
- E. Tapered Sweep Auger
- F. Drive Shaft
- G. Horizontal Discharge Auger
- H. Slide Gate Control Rod
- I. Vertical Discharge Gearbox Bottom Drive (Optional)
- J. Unload Clutch Bolt
- K. 3 Jaw Clutch
- L. Discharge Auger Drive Sprocket
- M. 3 Groove Drive Pulley Wheel
- N. Vertical Discharge Auger (Optional)
- O. Vertical Discharge Bearing
- P. Face Plate
- Q. Sweep Auger Coupler
- R. Sweep Auger Track
- S. Telescoping Bin Brace
- T. Belt Shield Cover
- U. Sweep Auger Wheel
- V. Chain Coupler
- W. Gearbox High Limit



FILLING THE DRYING BIN

The bin is normally filled by means of the Drying Bin Spreader, but could be filled by other equipment such as Shivers Level-Dry. The Spreader operates independently of the Circu-Lator or Dri-Flo and may be switched ON or OFF as necessary.

In Circu-Lator or Dri-Flo drying it is as essential to keep the grain as level as possible. The lower the grain depth the more critical the levelness is. It is important to aim the grain flow into the center of the Spreader to prevent spreading high on one side of the bin.

See Spreader Manual for more information on adjusting for even fill.

* Be sure to set the sweep(s) while filling the bin by turning the sweeps on for 3 or 4 seconds after the sweep(s) are covered with one foot of grain.

* Never attempt to operate Circu-Lator or Dri-Flo in grain depths over 16 feet.

(Bins over 38' Diameter – 10 feet.)

* Never fill Circu-Lator higher than bottom of lowest continuous flow boot.

* **DO NOT** fill bin over 6 feet deep with wet grain without making sure the bottom layer is dry and that the Circu-Lator or Dri-Flo is operating and the augers are “polished”.

* Always keep Basket Slide Gate closed during Circu-Lator and Dri-Flo operation.

* **DO NOT** attempt to run grain higher than 20% moisture content through the Circu-Lator or Dri-Flo.

During the first few hours of Circu-Lator operation, there is a tendency for Horizontal Discharge Auger (G) to turn due to bushing drag from Drive Shaft (F). This will normally stop after bushings loosen.

Grease may be observed leaking around the area of the 1” Drive Shaft (F) and Jaw Clutch (K) during the first hours of operation. This is excess grease working through the bronze bushing on the 1” drive shaft. The leakage will stop after a few days’ operation. It is not necessary to add more grease.

Keep Belts Tight. The belts on the Circu-Lator will stretch during the first few days’ operation and become loose, even though originally tight. Check the belts frequently.

ADJUSTING RECIRCULATION SPREADER

! DANGER

MAKE SURE THE MAIN POWER IS DISCONNECTED AND LOCKED OFF.

Circu-Lator Only

Recirculation Spreader Fins should initially be installed as directed below.

18' Dia. Bin – No additional Spreader Fins required. Built-in fins are adequate.

21' Dia. Bin – Small Tapered Spreader fins should be installed.

24' Dia. Bin – Medium 4 3/4" x 1 1/2" Rectangular Spreader Fins should be installed.

27' – 48' Dia. Bin – * Large Spreader Fins with elevating angle should be installed.

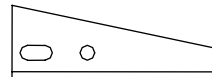
* Note: grain should contact the elevating angle. Circ I and Circ II rotate in opposite directions.

If a Level-Dry is installed, follow instructions in Level-Dry manual for installing spreader fins.

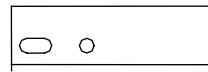
These fins may be used in any combination. Save the extra fins, as it may be necessary to adjust for different grains or different grain levels in the bin.

To increase Spreader throw, use the next longest size fins. To decrease Spreader throw, use the smaller size fins. Remember, it is essential to have the grain as level as possible.

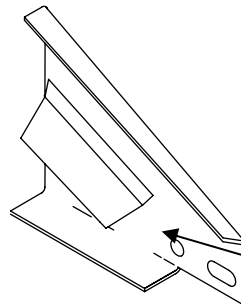
10A-047P Small fin for Circ I or Circ II



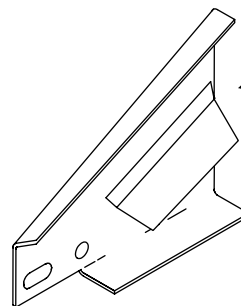
10A-048P Medium size fin for Circ I or Circ II



10B-049W Large fin for Circ I only



10-080W Large fin for Circ II only



Grain Contact Side.

CIRCU-LATOR AND DRI-FLO

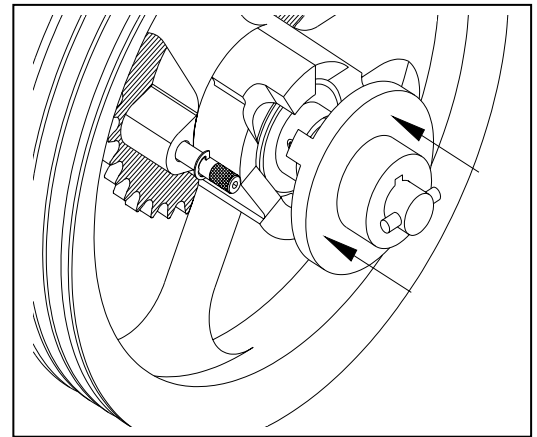
START-UP PROCEDURES

For Yellow Corn and Other Small Grains

1. All Crop Dryers, Augers, and Machines should be started and tried out several days or weeks before harvest season. Lubrication, maintenance, and repairs should be completed before the crop needs to come out of the field. See Preseason Checklist and Lubrication guide in this manual.
2. Read operating manuals for controls, fan and heaters, and any other installed equipment. Read Operators Safety manual P-10001.

⚠ DANGER

**MAKE SURE THE
MAIN POWER IS
DISCONNECTED
AND LOCKED OFF.**

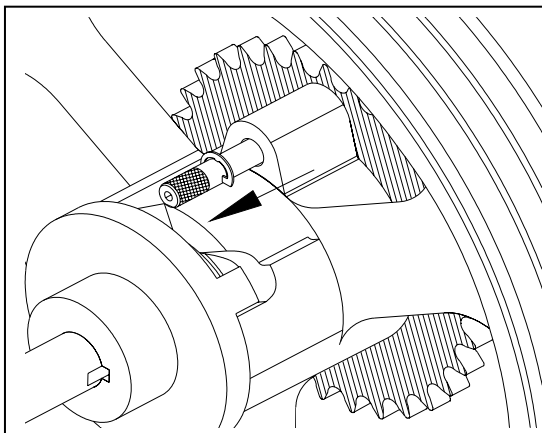


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3. Engage 3 Jaw Clutch on the 3 Groove Drive Pulley to engage Tapered Sweep Auger(s).

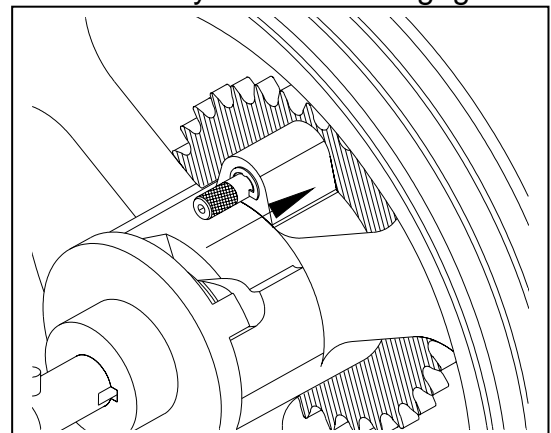
4. Be sure unloading clutch Pin is in the proper position. For Cicu-Lator operation, it should be disengaged (out). Since Dri-Flos are bottom unload machines, it must be engaged (in).

Clutch Pin Position For
Circu-Lator Operation.



Belt Shield removed for clarity.

Clutch Pin Position For Dri-Flo
Operation. - Clutch pin may be
replaced with shoulder bolt so it
can't easily become disengaged.



Belt Shield removed for clarity.

5. Place the Grain Level Indicator or Low Grain Shut Off (if so equipped) in the “ON” or “BYPASS” position.
6. Turn the Grain Hi-Limit Control Box (if so equipped) or the Fan Enable switch to the “ON” or “RUN” position.
7. Make sure that the unloading auger slide gate is in the “CLOSED” or “IN” position when using as a dryer. For Dri-Flo operation, never open the slide gate if the 3-jaw clutch is engaged.



BE SURE NO ONE IS IN THE BIN OR NEAR THE DRIVE MECHANISM BEFORE ENGAGING POWER!

8. Turn main power supply to the dryer “ON”.
9. Put approximately 6” to 8” of grain in the bin or just enough to completely cover the Tapered auger. Turn machine on for about 3 or 4 seconds. This gets the grain totally around the sweep(s) for easier start up. This may also be referred to as “Setting the Sweeps”. Bottom unload systems need to make sure take away system is running for this procedure.
10. Now finish putting approximately 2’ of grain in the drying bin.
11. Adjust the Grain Spreader in the top of the drying bin so that is spreading the grain evenly over the entire floor. The more level the grain is kept the more evenly the unit will dry.
12. Start the fan(s) and allow to run about 60 seconds before attempting to light the burner(s). This allows the plenum chamber under the bin to clear of any dust or gases before ignition of the burner.
13. Turn on the gas supply at the tank or gas meter. Check to see that all other valves between the supply and the burner unit are turned on. It is necessary when the unit is first installed to verify the type of fuel your unit uses.
 - A. Natural Gas
 - B. Liquid Propane

On propane units, you should check with your gas supplier to make certain the heater is connected to the proper valve to provide liquid as required for your unit.

14. Turn the plenum control in your control panel to the drying temperature desired. (See instructions for your particular control panel.) Refer to chart on page 11 of this manual for temperature setting guidelines for the type of grain being dried, or call the factory for recommendations.

15. Turn on the Burner Switch at the heater to allow thermostat control. The unit should light as soon as the Purge Cycle is completed. Allow the unit to burn for several minutes.
16. Adjust the gas pressure with the regulating device at the burner so that the fire is cycling from "HI" to "LOW" without going off. For other types of burners set them so they are able to achieve and maintain the temperature the control is set for. Check the Crop Dryer Manual for proper adjustments concerning vaporizers, etc.
17. Generally, you should increase the gas pressure a few pounds in the evenings to allow for cooler temperatures, and decrease the gas pressure during the day.
 RULE OF THUMB: On Hi-Low Fire Burners, it is proper for the burner to operate on low fire the major portion of the time.
18. Now you may continue to add wet grain until the grain depth is about 3 or 4 feet.
CAUTION! DO NOT OVER FILL as the Circu-Lator is difficult to start until the augers have been broken in. (Augers need polished up if new or if they have set for a long period of time) Once the augers have 3 or 4 hours of run time on them you can fill the dryer to the depths specified on page 7.
19. **The bottom layer of grain will need to be pre-dried approximately 1 hour for every 5 points of moisture to be removed.** Take several moisture samples during this period to keep track of grain moisture level. Turn Circu-Lator switch to manual position to take your moisture samples. Leave automatic controls off until grain is below 20% moisture level. When taking manual samples always average at least 3 samples to get an accurate moisture average.
20. When the grain moisture level has reached the desired level, follow the instructions supplied with your control for automatic operation. Periodically check the moisture level throughout the day to see if any changes or calibrations are necessary. Again, take several samples and average them before making any changes.
21. To increase the drying speed, raise the plenum temperature. A maximum of 160° is recommended for yellow corn for initial startup. Gradually increase plenum temperature and monitor drying system for "HOTSPOTS". If other grains are to be dried, see chart below or call factory for recommendations.

RECOMMENDED PLENUM
TEMPERATURES

Grain	Temp. F.
White Corn (for Milling)	120°
Yellow Corn	160°
Sunflowers	130°
Soybeans	120°
Sorghum (Milo)	140°
Wheat	140°
Barley	140°
Rice	105°

These are general recommendations only, and may need to be modified to fit certain conditions.

In general, grains to be used for seeds or malting will be dried at or below a plenum temperature of 120° F. This should keep the grain temperature below 100° F.

Another method to get increased drying capacity is to use a lower grain depth inside the drying bin. This results in lower static pressures and greater airflow.

22. A Static Pressure gauge can give you an indication of a build up of fines, trashy grain, or excessive grain depth. In this case, corrective measures should be taken as soon as it is practical.

Rule of thumb: If the static pressure is held below these levels, the drying speed is increased.

4 inches of W.C. for vane axial type fans

8 inches of W.C. for centrifugal fans or vane axial with turbo booster in use.

If the static pressure rises above these levels, it will drastically reduce the drying speed of the unit. Static pressure is the back pressure on the fan, created by the resistance of grain to air moving through it. Static pressure is influenced by grain kernel size, depth, cleanliness of the grain and bin floor, and venting in the bin shell. The higher the static pressures the slower the air moves through the grain.

23. Grain Level Indicator or Low Grain Shut Off (If installed) can be switched to the "AUTOMATIC" position after the Tapered Sweep has made 2 or more passes around the bin. After being switched to "AUTOMATIC", it will shut down the Circu-Lator or Dri-Flo and the Burner any time the grain falls below the indicator arm.
24. A Low Grain Shut Off does not normally clean out the Continuous Flow transfer augers. As soon as possible after the bin runs out of grain, manually run the augers to clean them out. Also run the Circu-Lator or Dri-Flo auger to purge it of hot/moist grain.
25. Make sure the grain is level in the drying bin and all sensors are properly calibrated for optimum performance and capacity. While operating at maximum temperatures check around the bin in the plenum and make adjustments if there is more than a 30° F variation. Consult burner manufacturer for details.

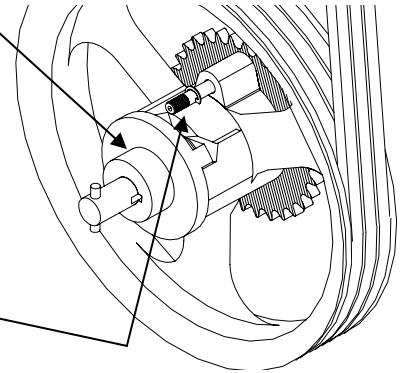
RECIRCULATION DRYING

RECIRCULATION is not normally done in DRI-FLO Models, so this procedure is shown for Circu-Lator Models.

The drying bin may be filled as fast as desired when re-circulating. However, the Circu-Lator and crop drying burner must be in operation when the bin is filled above a depth of 6 feet.

Engage the Jaw Clutch on the 3 Groove Drive Pulley.

Be sure unloading clutch pin is in proper position. For Circu-Lator operation, it should be disengaged (out). As Dri-Flos and Industrial Dri-Flos are bottom unloading machines, it must be engaged (in). For Dri-Flos, make sure the take away augers are energized when the unloading auger starts.

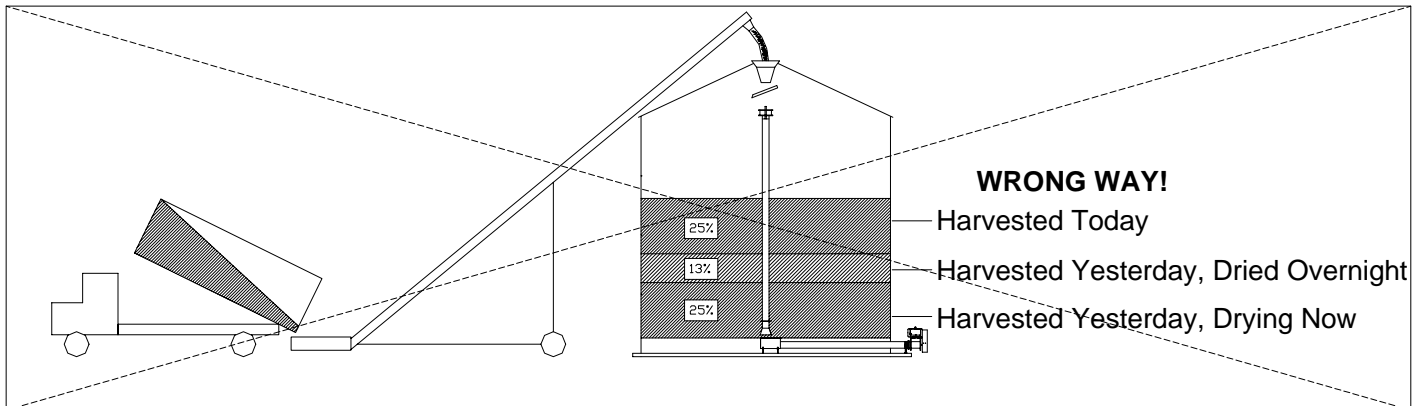


! DANGER

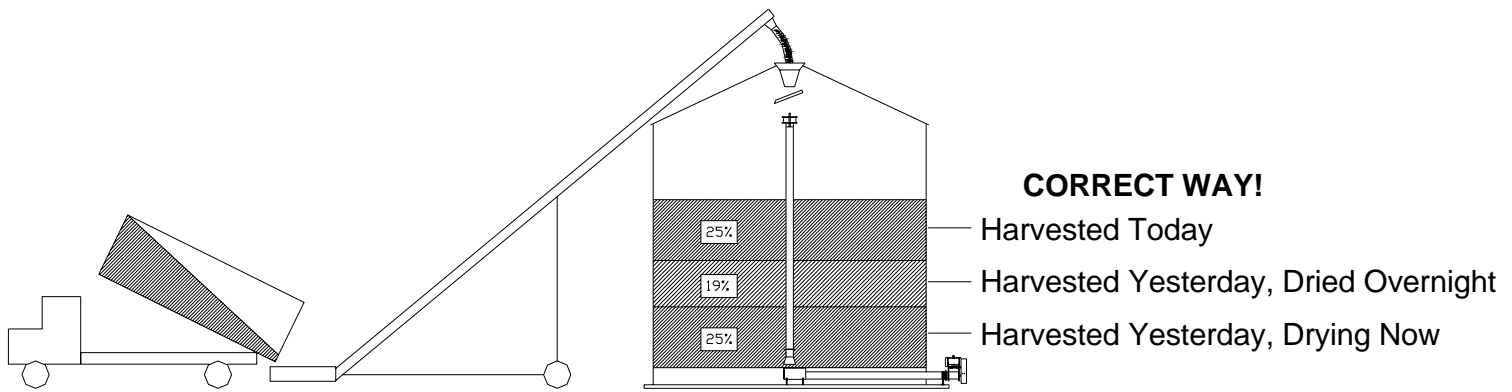
**MAKE SURE THE
MAIN POWER IS
DISCONNECTED
AND LOCKED OFF**

Belt Shield removed for clarity

**NOTE: SUCCESSFUL RECIRCULATION
DRYING REQUIRES TWO PASSES!**



Recirculation Drying while filling the bin can result in the formation of alternate wet and dry layers. In the illustration above, the 13% grain will have to be re-circulated in order to dry the 25% grain on top. This would result in undesirable over-drying of the 13% grain. To prevent this, the grain is dried in two passes.

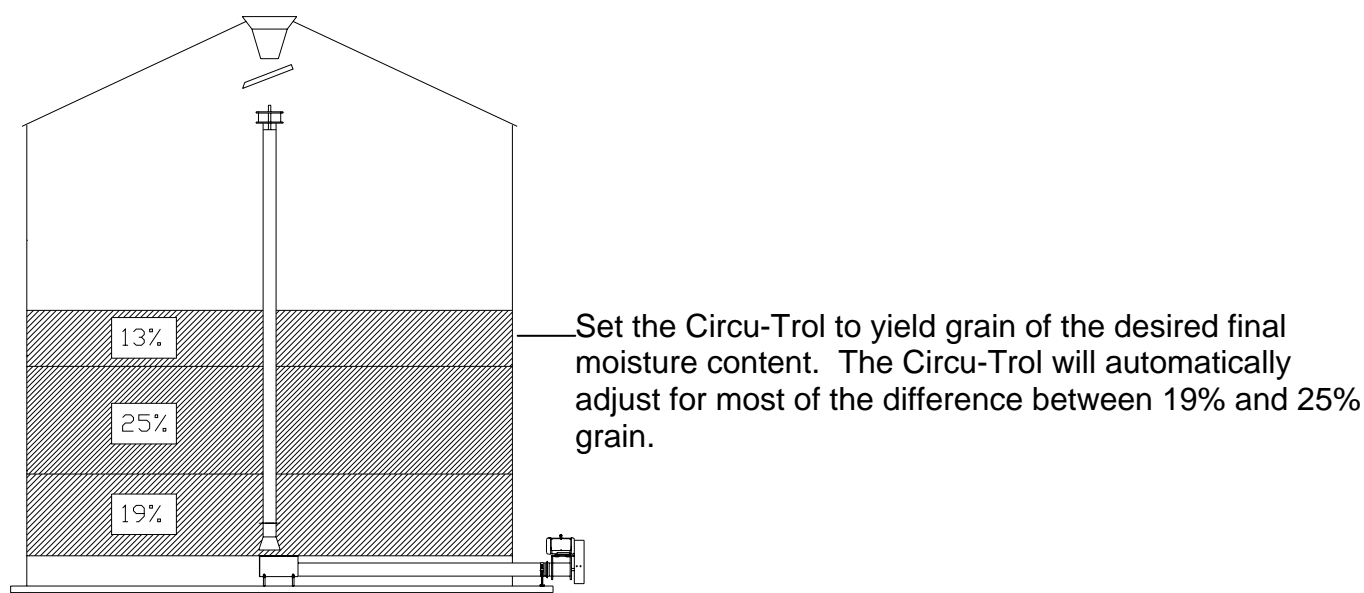


Step No. 1. Set the moisture control to remove 1/2 of the total moisture you intend to remove. Dry at this setting for the first pass.

In this example grain is harvested at 25% moisture content. A final moisture content of 13% is desired. This requires a total moisture removal of 12 points. One-half of this – 6 points- is removed in the first pass. This means that the moisture control is set to give 19% grain in the first pass. Dry at this setting until you finish filling the bin or until the bin is as full as you desire for your batch.

Do not allow the Circu-Lator to move grain wetter than 20%. If the moisture content computed for the first pass is higher than 20%, disregard the computed figure and use 20%.

Step No. 2. After the bin is filled, reset the Moisture Control to dry to the desired final grain dryness, and re-circulate until the bin is dry. Don't forget to cool the grain.



Insure that all of the grain in the bin is dry by probing for samples at the middle levels.

CHAFF ACCUMULATION

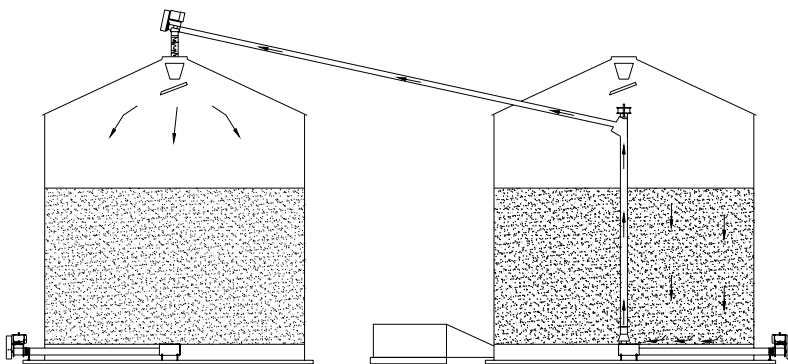
Fines and chaffy material will accumulate at the bin center. The recirculation spreader does not throw this light material as far as the heavier kernels.

The grain at the bin center may not dry properly and could remain wet after the rest of the bin is dry. If this condition exists and storage is intended, we recommend that grain as necessary be unloaded from the bin center via the bin unloading auger. Refill the grain back on top of the same bin, spreading it with the Input Grain Spreader. This will distribute the lighter material, allowing it to dry. When removing this cone of fines from the center of the bin, the Center Vertical will also be emptied of grain which could spoil during storage.

SIDEWALL CONDENSATION

Bin sidewall condensation can occur when drying with heat in temperatures below freezing. This can occur with any type of bin drying system, including the Circu-Lator. The result is the rewetting of grain along the sidewall, which is a storage hazard. Before drying the last bin full, empty the bin as much as possible to get rid of any wet grain on the sidewalls. Then the amount of condensation can be reduced by drying the last bin full at very low heat.

CONTINUOUS FLOW DRYING

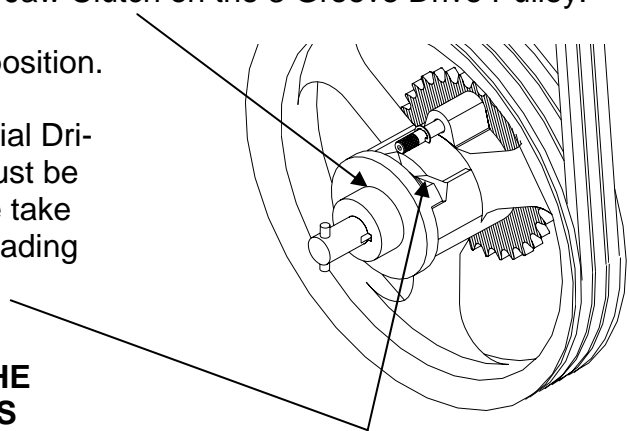


COOLING REQUIREMENTS

A cooling bin equipped with an aeration fan capable of delivering a minimum of 1/2 C.F.M airflow per bushel is required for Continuous Flo operation. In most cases, the air should be blown up through the grain. The aeration fan should be run for at least 24 hours after the bin is presumed to be cooled.

Engage the Jaw Clutch on the 3 Groove Drive Pulley.

Be sure unloading clutch pin is in proper position. For Circu-Lator operation, it should be disengaged (out). As Dri-Flos and Industrial Dri-Flos are bottom unloading machines, it must be engaged (in). For Dri-Flos, make sure the take away augers are energized when the unloading auger starts.



Belt Shield removed for clarity

⚠ DANGER

**MAKE SURE THE
MAIN POWER IS
DISCONNECTED
AND LOCKED OFF**

PROCEDURE

In Continuous Flow Drying, you will normally remove 1-2 additional points of moisture in the cooling process. Adjust the Moisture Control accordingly.

Moisture samples should be taken at least three times daily while drying. Large variations in the moisture content of the wet grain can cause corresponding, but smaller, variations in the moisture content of the dry grain. Usually these are of little consequence, as the grain is mixed (blended) in the cooling bin, and aerated thoroughly.

The optimum continuous flow drying depth will be 3-4 feet of grain. This depth allows efficient heat usage and high airflow for faster drying. Grain sorghum (milo) and wheat require careful attention because of their high resistance to airflow. Do not try to run with wheat over 6 feet deep or milo over 12 feet deep except when re-circulating the last bin full. This limitation insures that your drying speed and airflow are maintained. It may not be practical to maintain the most optimum drying depth. However, you should realize that a higher grain depth means higher static pressure and a lower airflow which means a slower drying rate.

UNLOADING STORED GRAIN

See the Operator's Safety Manual for more instructions on the bin unloading procedure.

If an Auxiliary Sweep Auger is used (for Circu-Lator 1 machines only), it may be installed after the grain has unloaded to the angle of repose (the angle at which the cone of grain stops flowing). The Auxiliary Sweep Auger must always be removed prior to refilling the drying bin.

Always clean out the unloading system after each use by closing the slide gate and running until the Augers are empty.
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PULLEY SIZES AND TRANSFER RATES

Transfer Rate	Circulator Motor Pulley	4"Continuous Flo Auger Auger pulley	Motor pulley	6"Continuous Flo Auger Auger Pulley	Motor Pulley
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Circu-Lator I with regular sweep auger (2.5" pitch)

180 BPH	3.25" OD	12" STD OD	3.25" OD	NA	NA
210 BPH	3.75" OD	12" STD OD	4.0" OD	NA	NA
225 BPH	4.0" OD	12" STD OD	4.0" OD	NA	NA
255 BPH	4.5" OD	12" STD OD	4.0" OD	NA	NA

Circu-Lator I with Hi-Cap sweep auger (3" pitch)

240 BPH	3.25" OD	12" STD OD	4.0" OD	NA	NA
254 BPH	3.75" OD	12" STD OD	4.0" OD	NA	NA
300 BPH	4.0" OD	12" STD OD	4.0" OD	NA	NA
335 BPH	4.5" OD	NA	NA	15" OD	2.75" OD

Circu-Lator II with regular sweep auger (2.5" pitch)

420 BPH	3.75" OD	NA	NA	15" STD OD	3.25" OD
450 BPH	4.0" OD	NA	NA	15" STD OD	3.25" OD
500 BPH	4.5" OD	NA	NA	15" STD OD	3.25" OD

Circu-Lator II with Hi-Cap sweep auger (3.0" pitch)

555 BPH	3.75 OD	NA	NA	15" STD OD	3.25" OD
600 BPH	4.0" OD	NA	NA	15" STD OD	4.0" OD
670 BPH	4.5" OD	NA	NA	15" STD OD	4.0" OD

Circu-Lator II with Ultra Hi-Cap sweeps (4.06" OD 3" pitch) – 8" Transfer Augers are recommended

670 BPH	3.25" OD	NA	NA	12" STD OD	3.25" OD
780 BPH	3.75" OD	NA	NA	12" STD OD	4.0" OD
836 BPH	4.0" OD	NA	NA	12" STD OD	4.0" OD

Dri-Flo 500 capacities same as Circu-Lator II with regular or Hi-Cap sweeps.

Dri-Flo 1000 Capacities same as Circu-Lator II with Ultra Hi-Cap sweeps.

Capacities are approximate and will vary depending on grain type, moisture content, and condition of auger.

3 GROOVE, A SECTION, MOTOR PULLEYS

SHIVVERS PART #	DESCRIPTION
249B-001A	3.25" OD 1 1/8" BORE
249C-001A	3.25" OD 1 3/8" BORE
249C-001A	3.75" OD 1 1/8" BORE
249R-001A	3.75" OD 1 3/8" BORE
249D-001A	4" OD 1 1/8" BORE
249E-001A	4"OD 1 3/8" BORE
249G-001A	4.5" OD 1 3/8" BORE

2 GROOVE, B SECTION, PULLEYS

SHIVVERS PART #	DESCRIPTION
50L-001A	2.75" OD 7/8" BORE
50M-001A	2.75" OD 1 1/8" BORE
249J-001A	3.25" OD 7/8" BORE
249K-001A	3.25" OD 1 1/8" BORE
249L-001A	3.25" OD 1 3/8" BORE
249M-001A	4" OD 7/8" BORE
249N-001A	4" OD 1 1/8" BORE
249O-001A	4" OD 1 3/8" BORE

3 GROOVE, AB SECTION, PULLEYS

SHIVVERS PART #	DESCRIPTION
699F-001A	3.25" OD 1 1/8" BORE
699G-001A	3.25" OD 1 3/8" BORE
699H-001A	3.5" OD 1 1/8" BORE
699I-001A	3.5" OD 1 3/8" BORE
699J-001A	3.75" OD 1 1/8" BORE
699K-001A	3.75" OD 1 3/8" BORE
699M-001A	4" OD 1 1/8" BORE
699N-001A	4" OD 1 3/8" BORE
699O-001A	4.25" OD 1 1/8" BORE
699P-001A	4.25" OD 1 3/8" BORE
699R-001A	4.25" OD 1 5/8" BORE

3 GROOVE, A SECTION, AUGER PULLEY (HORIZONTAL UNLOAD)

SHIVVERS PART #	DESCRIPTION
423-067-001A	15" OD 1 3/8" BORE

2 GROOVE, B SECTION, AUGER PULLEY (CONTINUOUS FLO.)

SHIVVERS PART #	DESCRIPTION
423-072-001A	12" OD 1 1/4" BORE
423-073-001A	15" OD 1 1/4" BORE

3 GROOVE, AB SECTION, AUGER PULLEY (CONTINUOUS FLO.)

SHIVVERS PART #	DESCRIPTION
423-385-001A	12" OD 1 1/4" BORE
423-386-001A	15" OD 1 1/4" BORE

MAINTENANCE

Tapered Sweep Auger(s)

The pressure under which the Tapered Sweep Auger operates causes it to wear much faster than the other augers in the system. It should be inspected and replaced if the fluting near the center of the bin is worn to a sharp edge, flipper worn off, and fluting worn off outer edge. An auger worn to this degree will have lost its “calibration” and will not pick up the grain properly. The result could be an area of wet grain concentrated at the bin center, which would be subject to spoilage if stored. A worn auger may not advance around the bin properly. Hard Surfaced augers are available from Shivers and will provide longer service.

Belts

Keep the drive belts on the Circu-Lator motor tight. These belts will stretch in operation, especially when new. If these belts should slip, the probable result will be a stalled Circu-Lator.

Starting a stalled Circu-Lator or Dri-Flo

When a Circu-Lator is operated with slipping belts, the center tube can become packed with grain and stall the machine. The Circu-Lator or Dri-Flo may also be stalled by operating in wet grain or by filling the bin without “SETTING THE SWEEPS”.

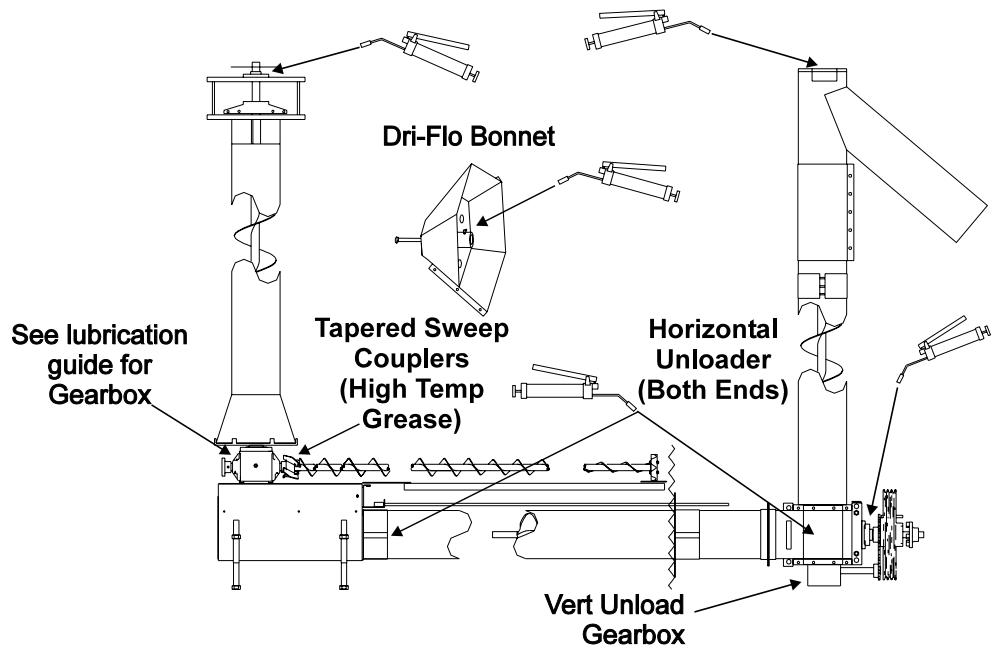
Having the bottom layer of grain dry is essential to starting a stalled Circu-Lator or Dri-Flo. This may be accomplished by operating the crop drying fan and heater at approximately 100° for four to ten hours. In difficult cases, it may be necessary to over dry the bottom layer of grain.

Use the following procedure when the bottom layer of grain is dry and the Circu-Lator or Dri-Flo is still stalled:

1. Unload 50 bushels of grain by pulling the slide gate and disengaging the jaw clutch and engaging the clutch pin.
2. Switch the Circu-Lator or Dri-Flo on and off 3 – 5 times (with the jaw clutch engaged) to break it loose
3. Repeat above procedure as required.

Lubrication

Grease the points indicated below before each season. Use a good grade Moly type Extreme Pressure No. 2 grease. The tapered sweep couplers require a special high temperature grease (Shivers Part # C-6188).



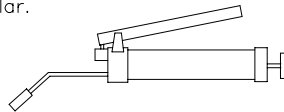
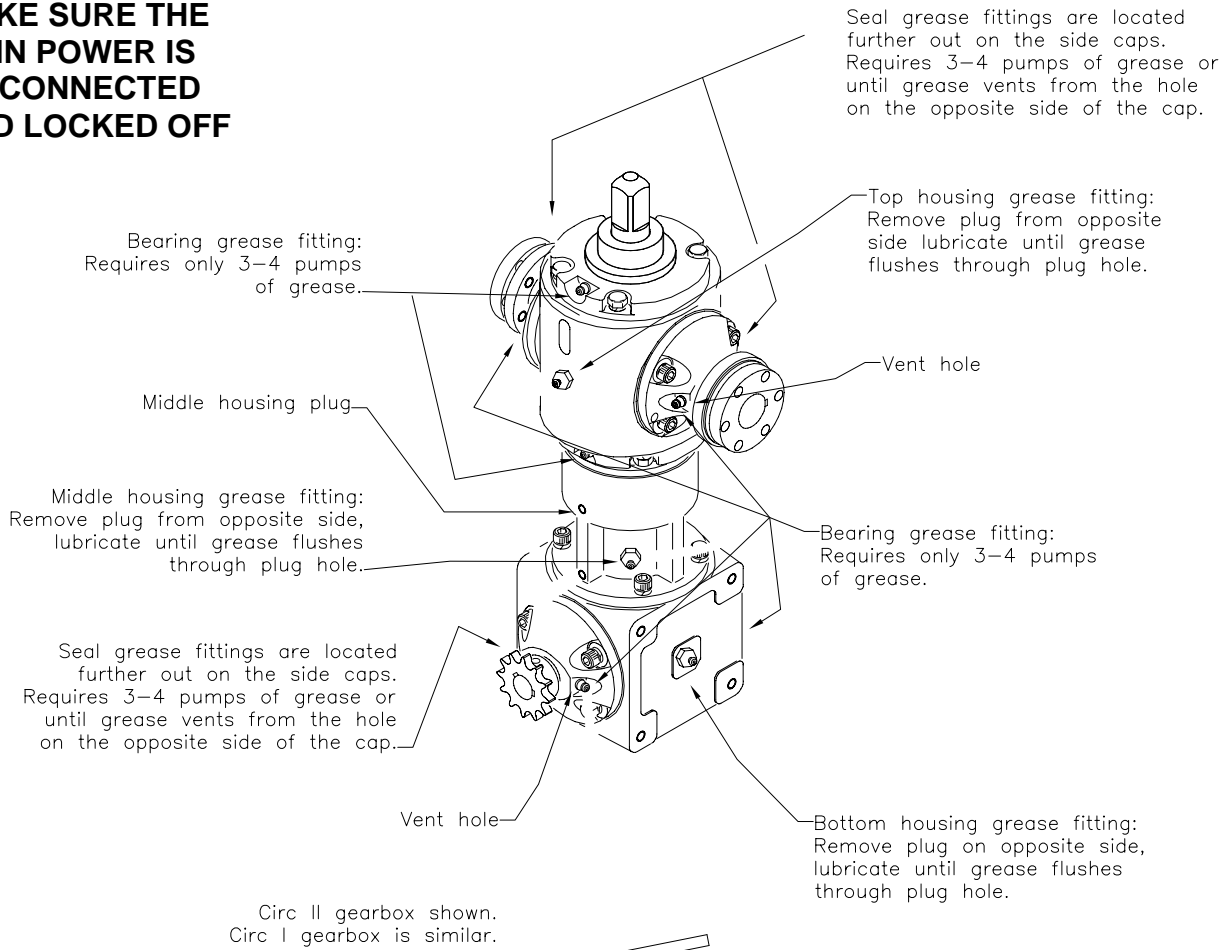
! DANGER

**MAKE SURE THE
MAIN POWER IS
DISCONNECTED
AND LOCKED OFF**

DANGER

Gearbox Lubrication Guide

MAKE SURE THE MAIN POWER IS DISCONNECTED AND LOCKED OFF



For standard (black, blue) Gearboxes use a Moly-Lithium base Extreme Pressure No.2 grease (NAPA Valvoline# 633).
Shivvers part # C-6185.

For High Temp (silver, red, copper) gearboxes use high temp grease Chevron Ulti-Plex Synthetic EP.
Shivvers part # C-6188.

NOTE: GREASE INTERVALS

Circulator I	Every 100,000 Bu	OR Once a year, whichever comes first.
Circulator II DriFlo 500	Every 150,000 Bu	
High Torque DriFlo 1000	Every 250,000 Bu	

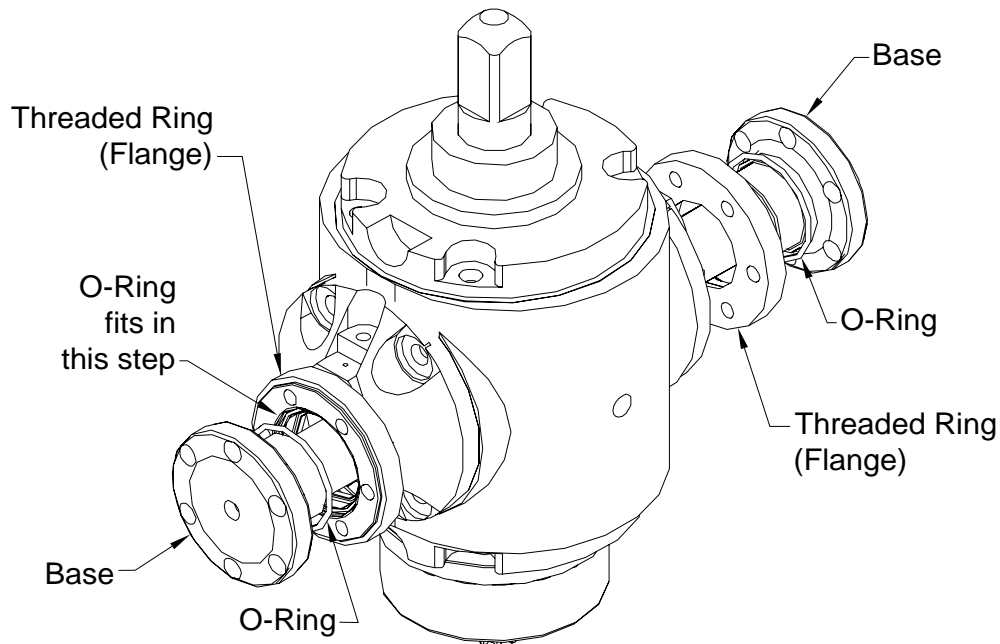
TAPERED SWEEP INSTALLATION AND LUBRICATION

! DANGER

**MAKE SURE THE
MAIN POWER IS
DISCONNECTED
AND LOCKED OFF**

Step 1:

If your Gearbox is a Circulator-2 (or Dri-Flo) or High Torque Drive (made or upgraded after Summer 2006), there should be an A568-134-Viton O-Ring (Shivvers# D-3771) on the Output Shaft between the Base and Flange. If not, place one onto each Output Shaft by stretching it over the Base end. The O-Ring should return to normal size and fit inside the step of the threaded ring (Flange), between it and the back side of the Base.



On all other Gearboxes (Circulator 1 or Junior) or (Circulator 2, Dri-Flo, or High Torque Drive prior to summer 2006), the O-Ring is omitted. The new style Tapered Sweeps will still work on older style gearboxes. Also, older style sweeps will work on new style gearboxes.

Step 2:

The following directions apply for all Shivvers Tapered Sweep installations, (Circulator-1, or Circulator-2, Dri-Flo, High Torque Drive, or Junior)

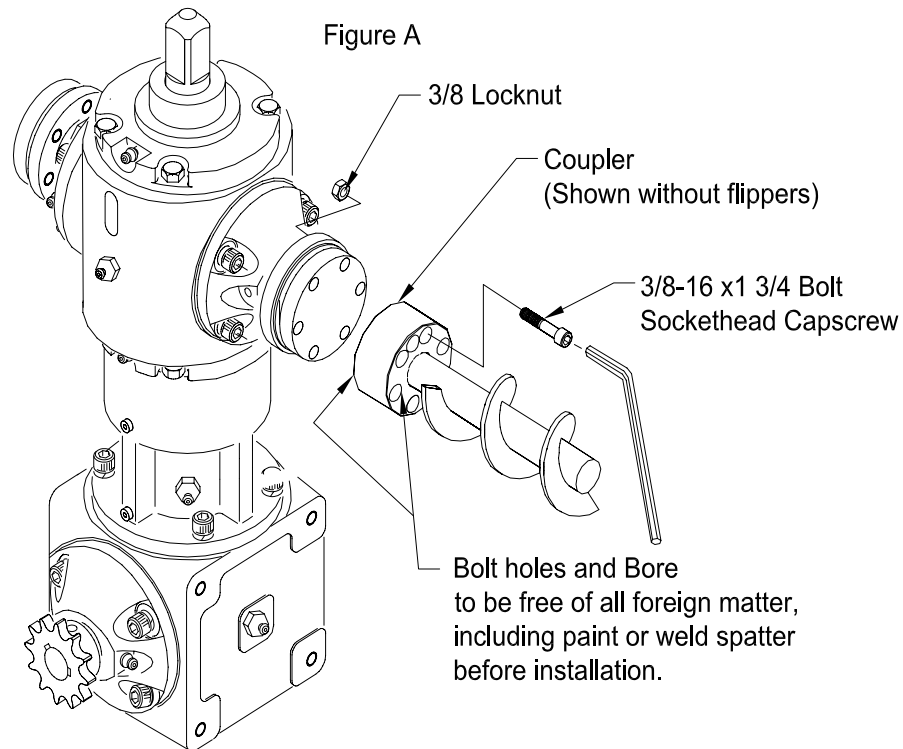
- a. Remove all debris from the Tapered Sweep Coupler and outside surfaces of the gearbox base and flange.
- b. Pack the inside of the Tapered Sweep's Coupler and coat the outside of the Gearbox's Base and Flange with our recommended High Temperature rated Grease, Chevron Ulti-Plex Synthetic Grease EP or equivalent. (Shivvers# C-6188 (14oz Tube)) CAUTION: USE ONLY THIS GREASE. Other greases may harden in the coupler, causing sweeps to break.

Step 3.

Bolt the Tapered Sweep Auger(s) to the gearbox as follows: See Figure A

- a. If the coupler wasn't fully packed in Step 2, slowly add 1 or 2 pumps of Hi-Temp grease (Shivvers #C-6188) through the recessed grease zerk.
- b. Remove and discard protective plate and gasket or caplugs from tapered sweep coupler. 3/8-16 SHCS (F-2158) and locknuts (F-1005-03) are provided in the decal package, 225-077A. This special bolt and locknut must be used.
- c. Position the sweep's coupler onto the output shaft.
- d. Insert Bolts into sweep's coupler, through the output shaft, and start the threads into the flange, then start a locknut onto the end of each bolt.
- e. Tighten the bolts down to about 36-40 ft/lbs.
- f. With a wrench on the head of the bolt, tighten the locknut, in effect double-nutting it with the flange.
- g. Repeat the above process to install all Tapered Sweeps as required.

It is recommended that these special bolts and locknuts not be re-used. See your dealer or Shivvers for a replacement of hardware sack #635-014A.



PRE-SEASON INSPECTION

As Shivvers is a service-oriented company, we strongly suggest that a pre-season inspection be performed on your drying unit. This inspection sheet was designed to prevent most of the common problems encountered in using a Shivvers grain dryer. It will help identify the areas which may cause a breakdown during the drying season, and give you enough time to order any replacement parts needed. It is recommended to hire a trained Shivvers dealer to do the dryer inspection.

Before starting the mechanical inspection be sure to **TURN OFF THE POWER** – then **LOCK OFF** at the **MAIN POWER PANEL**. This is for **YOUR PROTECTION!!** **DO NOT** assume that the power is off! Keep all power locked off unless checking motors and voltages from a safe distance.

MECHANICAL INSPECTION



MAKE SURE THAT THE POWER TO THE ENTIRE DRYING SYSTEM IS DISCONNECTED AND LOCKED OFF!

This Check Sheet is provided as a “place to start” when inspecting the mechanical components of the system, and may require some “judgment calls”. The amount of grain put through the dryer in any given year will have a large bearing on what parts to replace and when.

Locating and correcting potential problems due to normal wear and tear may very well prevent costly and inconvenient “Down Time” during the busy drying season.

- Work Safely! **SHUT OFF POWER!** – then **LOCK OFF** at the **MAIN** switch panel. Never enter the bin unless all power has been **LOCKED OFF!**
- Check for safety and Warning Decals at each of the bin openings. (Shivvers will provide these at **NO CHARGE.**) See P-10001, Operators Safety Manual for details.
- Check tapered sweep auger for wear. (Razor sharp flite, flite gone at end, no taper at any one spot.)
- Check for flex in tapered sweep auger coupling. Make sure that flex is consistent around the bin. (Minimum of 6” of free travel when end is lifted off floor.) Unbolt sweep and clean coupler if required. Replace worn bolts and locknuts, if applicable.
- Check play in Gearbox side shafts. (Can move sweep up and down or side to side with no clearance variance between shaft and side cap.)

- Lubricate standard Gearboxes (painted blue or black) using only Moly-Lithium Extreme Pressure No. 2 grease. (NAPA-Valvoline #633.) Lubricate High Temp Gearboxes (painted silver, red & copper) with Chevron Ulti-Plex Synthetic. There should be 11 grease zerks on silver and black gearboxes & 12 zerks on blue, red & copper gearboxes.
- Check Pick-up Finger clearance. (Should be 3/8" to 5/8" above spider wheel, and 3/8" to 3/4" clearance between edge of flite and inner surface of cone.)
- Check coupler on bottom of Pick-up finger for flex and wear (rounding out or cracks at corners.)
- Check cone for wear. Replace cone if worn through. Do not patch!
- Lubricate bearing at top of Center Vertical. (If Circu-Lator Jr., also check gears for wear and alignment.)
- Open inspection hole on Continuous Flo Boot, inspect Continuous Flo fliting for wear. (If flite is razor sharp you may want to replace it.) Also clean out grain in bottom of boot.
- Inspect Center Vertical fliting for wear through inspection hole on lowest Continuous Flo Boot and where moisture sensor is mounted.
- Lubricate bearing and flite assembly of Horizontal Unload Auger. Grease zerks are located at flipper end near discharge chute of auger and by chain coupler on newer units.
- Check tightness of set screws in bearings and drive pulleys. (Also inspect Jaw Clutch and pulley coupling for wear.)
- Lubricate Gearbox and bearing on Vertical Unload Auger. (If installed.)
- Lubricate bearing on Continuous Flo drive head. Check set screws also.
- Inspect all drive belts for tension and wear.
- Clean fines and other trash from above and below drying floor.
- Make sure all Safety Guards are in place.

PRE-SEASON INSPECTION (Cont.)

This part of the inspection deals with the electrical components, operating the motors and the fan.

ELECTRICAL INSPECTION



BE SURE NO ONE IS IN THE BIN OR NEAR THE DRIVE MECHANISM BEFORE ENGAGING POWER!

- Check Safety and Warning decals on each of the bin openings. (Shivvers will provide these at NO CHARGE.) See P-10001, Operator's Safety Manual for details.
- MAKE CERTAIN THAT NO ONE IS INSIDE THE BIN OR NEAR MOTOR AND DRIVE BELTS.
- MAKE CERTAIN THAT UNIT IS FREE TO TURN & NOTHING IS JAMMED IN IT.
- Unlock power and turn it on. Make sure that any individual circuit breakers are turned on.
- Turn "Grain Level Indicator" or "Low Grain Shut Off" to the "ON" or "BYPASS" position. Turn Control panel power on.
- Check contactors and motors for Circu-Lator and Continuous-Flo augers by turning the switches for each to the "ON" position.
- Check all automatic controls for proper operation.

FAN AND HEATER INSPECTION

- Clear area of fan intake burner and transition of all weeds and other trash that could be ignited.
- Start fan motor. Units with multiple or high horsepower fans should be tested separately or with some grain left in the bin. High airflow rates can cause the floor to lift, or can knock over some floor support systems. Make sure roof vents or hatches are open. If unit is equipped with clean-out doors open them.
- Open main gas valve at supply.
- Turn burner switch "ON".
- Check for Gas Leaks with soapy water.
- Check Hi-Lo fire after unit has ignited and warmed.
- Shut main gas valve off at supply and allow line to burn out.
- Check No Flame Lock-Out for proper operation after flame goes out.
- Reset No Flame Lock-Out Relay and shut fan down.
- TURN POWER OFF AND LOCK OUT AT MAIN POWER BOX.