MOBILE MIX

OPERATORS MANUAL
TRUCK - TRAILER - STATIONARY

MODEL

203 325 405 430 630
253 375 470 502 720
303 425 540 575 810
12z24 14z24 16z24 900
14z30 16z30 18z30 20z30 1200 & 1400

! IMPORTANT !

FAILURE TO COMPLETE
THE ENCLOSED WARRANTY
CERTIFICATE MAY VOID YOUR

WARRANTY

IF YOU NEED ASSISTANCE CALL
1-800-227-1702

Harsh International, Inc.
600 Oak Avenue
Eaton, CO 80615
(970) 454-2291
Fax: (970) 454-3491

December 26, 2000

December 26, 2000

TO: Stationary Harsh Mixer Dealers & Customers

RE: Installation of safety equipment

All stationary installations should include any necessary additional protection such as shields, guards, covers, etc. to protect the operators and/or bystanders from injury from the mixer drive, power source, mixing chamber or unloading system. This includes but is not limited to shields around the driveline, shafts and motor as well as covers over the mixing chamber if appropriate.

Stationary units are mounted in various locations and are often part of a complete installation package which precludes any standard factory shielding. The installer and customer should completely evaluate each application and insure that the necessary protection is installed. We also stress that all federal, state, and local codes must be followed.

Congratulations on your recent purchase of a Harsh Mixer! This manual is only a small part of Harsh's continuing effort to serve their customers and bring the best products possible to you the customer. If you have any questions or experience any problems contact your local Harsh Distributor or the Harsh Factory.

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Eaton, Colorado 80615
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SAFETY INSTRUCTIONS

The following is provided as a guide to help prevent damage to the unit and/ or injury to the operator or bystanders. As with all equipment an alert operator must observe these and all general guidelines.

1. Always insure the inside of the unit is free of obstructions prior to use and when loading.

2. Do not overload the unit.

3. Keep all shields/ guards in place during operation.

4. Never leave the unit running unattended.

5. Stop the mixer before performing any service or making any adjustments.

6. Keep hands, feet, and clothing away from moving parts.

7. Stay off the mixer while in operation.

8. Observe all applicable highway traffic rules and regulations during operation on public roads.

9. Watch out for other people, keep them out of the way.

10. Become familiar with all controls before operating the unit.

11. Use extreme caution around structures or congested areas.

12. Contact your local dealer for all parts and repairs.

13. Do not use the trailer jack with feed in the unit. The jack was not intended to support a loaded unit. When necessary, use a suitable jack and block the trailer tongue with a suitable support.

14. Never position yourself above the sides of the mixer when it is in operation.

15. Always use a fork or shovel when loading the unit manually.

IMPORTANT INFORMATION

This manual has been prepared to provide the owner and operator with the information required to properly operate and maintain his unit. It is important that you the owner or operator read this manual prior to operating or performing any maintenance work on the unit. This manual is for all mixer models. When using this manual all directions are given as if you are standing behind and facing the rear of the unit.

Date of Purchase: _____
Serial Number: _____

Information Needed for ordering parts.

Model Number _____
Type (Truck, Trailer, Stationary) _____
Ration Type (Feedlot, Haymogenizer, High Roughage) _____
Discharge Length _____
Special Options _____
_____
_____
_____

LUBRICATION SPECIFICATIONS

GTD Bearings
Drive line Bearings
Splined Drive line Yokes
Shear Bolt Yokes
PTO Shaft
Discharge Auger Bearings
Main Auger Bearings . . . . . NLGI #2 or #3 Lithium Base Grease

Reversing Gear Box . 80/90 gear oil. . . . . EP-95 to EP-105

Oil Bath Drive Chain (Rear Drive) Clean Motor Oil or Mineral Oil
Drive Chain (Discharge) . . . . . SAE-20 in cold weather
SAE-30 in warmer weather

Hydraulic Oil . . . . . SAE-10 ISO 32 or Equivalent ATF
Indol #32
Dextron #32
Hydtostat Oil >>>>>>>>>>>>>>>>>>>>>>> ISO 68 NORMAL TEMP.. ISO 32 COLD
CHANGE EVERY 2200 HOURS

Planetary Gear Box . . . . . Change the oil after the first 50 hours of operation.

Oil should be changed at 500 hour intervals thereafter. Use a GL-5 grade
EP 80/90 gear oil (EP="Extreme Pressure"); use of synthetic oil is permitted too.

New Mixer Break-In

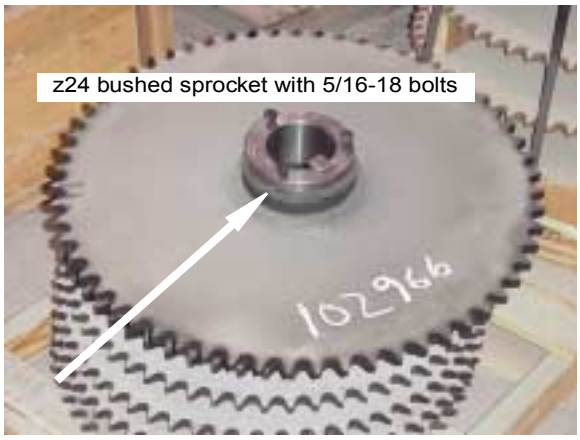
In order to properly break in a new mixer unit it is necessary to operate the unit at ap proximately 60% of capacity for ten loads. This allows the mixing augers, discharge system, and the inside of the unit to become polished thus decreasing the amount of load on the drive system.

Note: F or z24 Haysizor units, retorque the sprocket bushing bolts to the standard specification for that size grade 5 bolt after the first 10 to 15 loads.

Grade 5 Torque Specifications:

1/4 - 20	114	in-lbs
5/16 - 18	234	in-lbs
3/8 - 16	416	in-lbs
7/16 - 14	670	in-lbs
1/2 - 13	1020	in-lbs

On trailer models check the wheel lug bolts to make sure that they are properly tightened and that the tires are inflated to 80 PSI prior to use.



Rear Drive: Sprocket Bushing Bolts

Trailer Models: Proper Tire Inflation is 80 PSI.

Tractor Requirements

Use only an adequately sized tractor which can handle the PTO, hydraulic, and maneuverability requirements of the unit.

The PTO speed requirements of the units are 540 or 1000 RPM. Check the front of your unit for a decal to see which speed your unit will run at. The PTO horse power required to operate the unit will vary according to the ration being mixed, volume of the load, and will be determined by actual use.

The tractor must have dual hydraulic outlets to meet the hydraulic

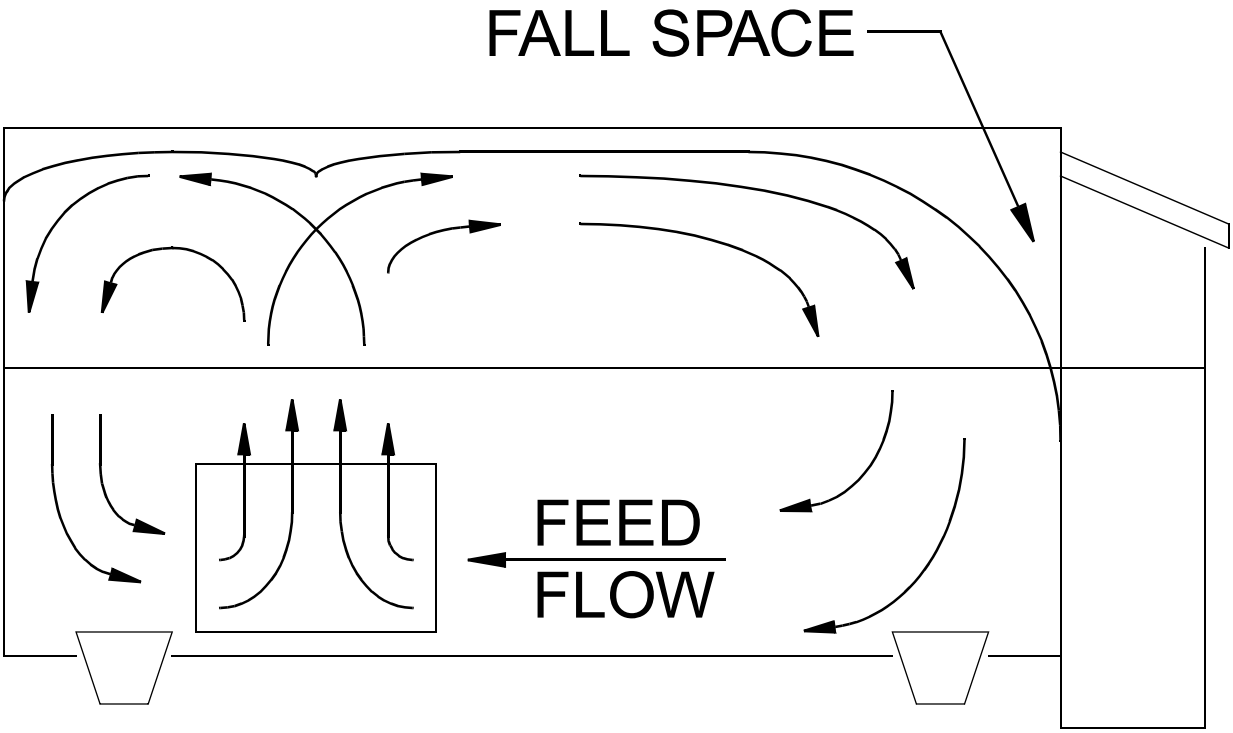
requirements of the mixer unless an integral hydraulic system has been installed. One outlet is needed to operate the discharge door and a second outlet to operate the discharge spout and discharge augers. The hydraulic discharge drive system requires a minimum of seven gallons per minute for the hydraulic motor to maintain an auger speed of 100 RPM's. A minimum of 1500 PSI is required to operate the door and drop chute under load.

The empty weight of the unit plus the weight of the ration must be added together to obtain the gross mixer weight. The size and weight of your tractor must be adequate to start, maneuver, and stop the total load under the ground conditions and environment that will be encountered during operation. Also, always insure you have a drawbar of sufficient strength which will accept a hitch pin of the same size as is provided for in the mixer hitch. Use a drawbar pin that has provisions for a locking device on the tractor drawbar.

Loading a Feedlot Mixer

Position the unit on level ground and set the parking brake to prevent the unit from moving. Make sure the discharge door is closed before loading. Engage the PTO with the engine at idle. Increase the engine speed to the rated PTO speed for loading. During loading avoid striking the augers with the loading device. For the best results, when loading a grain mixture you should add the grain first. When adding liquid to the ration you should always add the liquid last. Avoid feed lengths over 3 inches long, hard frozen silage, chunky material, and foreign material like dirt or rocks.

Mixer Loading



The mixer is designed to provide maximum mixing efficiency when loaded between 40% and 90% of the total volume. This will insure enough feed ration is available in the unit to allow the lower augers to move it forward and the upper augers to move the ration to the rear giving it a more complete mix. If you are loading the unit slowly you may not want to start the mixing action until the lower augers are completely covered. Overloading the unit will decrease the efficiency of the mixing action. One characteristic of an overloaded mixer is that the feed is forced over the front, rear, or sides of the unit. Always load your material to the front of the mixer to allow the ration to fall in the rear.

The mixing time will depend on the ration being mixed and will vary. The mixing time needed can be found through actual use. When you are confident the ration is properly mixed you should stop the mixing action until you begin the unloading process.

Note: When loading hay or other commodities manually, **never position yourself above the side of the mixer**. This may allow you to fall into the mixing chamber while it's running.

Never use your hands to throw hay or other commodities into the mixer. You may become entangled in the hay or twine and be pulled into the mixing chamber.

Always use a fork or shovel when loading the unit manually.

Loading a Haymogenizer

The Haymogenizer and High Roughage units are designed to process good quality, long cut, alfalfa hay down to a length that can then be mixed with other commodities. The intent is to provide a machine that will perform this process and feed the ration in one operation. The first step is to determine the amount of hay to be used, keeping in mind that using long cut alfalfa hay instead of ground hay will require a larger mixer capacity to hold the same number of pounds of hay. When loading the mixer you should always allow for the uneven action of the hay during mixing and not completely fill the box.

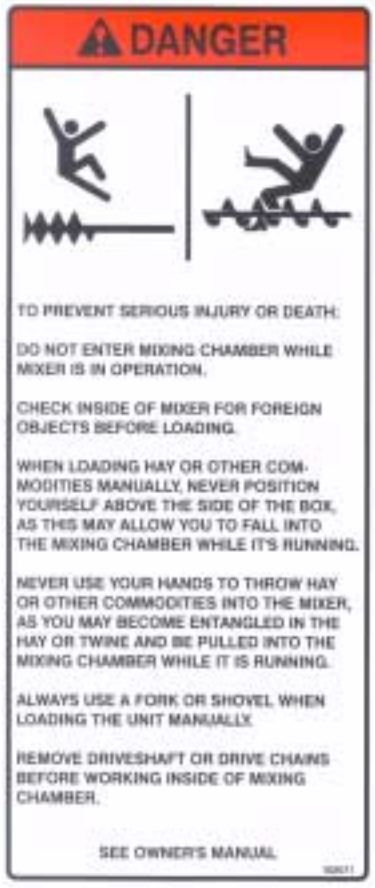
Quality, type, and condition of your hay are very important points to consider when obtaining hay to be used in your Haymogenizer. As stated, the unit was intended for only good quality alfalfa hay. This means the alfalfa hay must be fine stemmed and without the coarse stems found in some hay. We do not recommend the unit be used to mix grass hays, corn stalks, or other non-alfalfa hays or grasses. The hay should be dry hay of 15% moisture content or less. In some conditions the unit will process 15%-20% moisture hay, however, you should decrease the amount of hay used by up to 50%, and the loading must be done much slower. Never use hay with a moisture content over 20%, as it may wrap around the augers or

pack against the mixer tub or between the augers. If these conditions do occur, severe damage may result to the drive system. Many operators use a moisture tester to confirm the moisture content of their hay. This is very helpful when you do not know the conditions under which the hay was put up or stored.

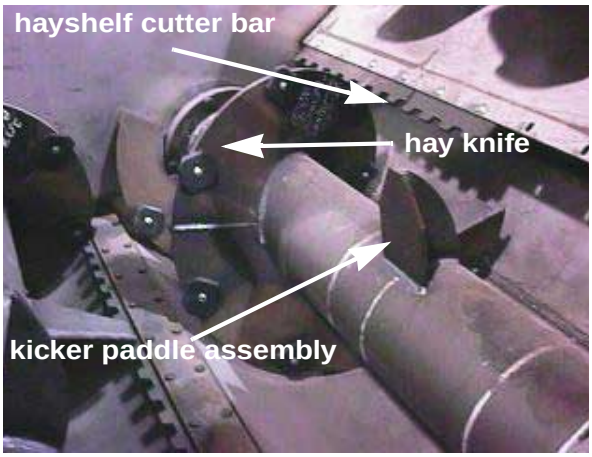
The hay you use can be loose or in square bales. Never try to put whole round bales into the unit. The best procedure to follow is to cut the bale twine and pile the hay inside a commodity shed. After the bales are cut, you should use a loader to break them apart by pushing them into a pile. The commodity shed will prevent them from becoming wet from the weather. Breaking the bales apart also makes it easier to load smaller quantities at a time and helps prevent large slabs of the bale from falling into the mixer. You should always insure that all the twine or wire has been removed from the hay prior to loading into the mixer as this prevents it from being wrapped around the augers, flighting, and kickers. Excessive amounts of twine can effect the torqure requirements of the unit and cause component failure.

Before loading the mixer, position the unit on level ground and set the parking brake to prevent the unit from moving. Make sure the discharge door is closed before loading. Engage the PTO with the engine at idle. Increase the engine speed to the recommended RPM for loading.

When loading hay and other commodities into the mixer you should use a tractor loader or some other suitable mechanical loading system. Also, during loading avoid striking the augers with the loading device. If you are loading the hay or other commodities manually you should stand on the ground. Never position yourself level with the top of the mixer or above the top of the mixer and throw hay into it as you may lose your footing and fall into the mixing chamber.



Always use a fork when throwing hay into the mixer manually and never throw hay into the mixing chamber with your hands as you may become entangled in the twine or wire and be pulled into the mixer. When you begin the loading process you will want to load the hay first. This will allow the hay to be broken and processed down to a point where other commodities will fit into the box. The size of the mixer will determine how much hay you can load at a time. The smaller units can process 150 to 200 pounds per loader bucket, where as the large units may be able to handle 200 to 400 pounds per loader. As you put more hay into the unit you should decrease the amount of each bucket to allow the new hay a chance to be fully processed. The time between buckets of hay should be adequate to allow the hay to go through the auger cycle several times before the next load of hay is added.



Haysizor models are specially designed with Hay Knives that pass through Cutter Bars to more effectively process rations that require Hay as a part of the feed mixture.

As the hay is loaded into the mixer it will be moved to the rear of the box by the top augers. As it approaches the rear of the mixer it should fall down into the bottom augers which will bring the hay forward to the door area. The hay will now move upward and begin the flow cycle again. As you load more hay you must always maintain room in the rear of the unit for the hay to fall. This helps break the hay apart and also prevents the hay from packing against the rear end sheet. If the hay does pack against the rear of the unit and this flow is bridged, you can damage the auger drive system by overloading it. Overloading the augers can occur by loading the unit with too much hay, loading the unit too fast, loading too much hay at a time, or loading wet hay.

Allow the hay to process by running the unit with the hay for a period of time prior to adding other commodities. If you have additional dry commodities such as grain you can add them sooner than wet commodities. Once you introduce wet commodities such as silage, etc. into the mixer the hay will begin to absorb the moisture immediately, become tough, and the breaking process stops. This tough hay with long stems can also pack between the augers and sides and require excessive torque loads on the drive.

After the dry commodities have been added you can begin to add the wet ingredients at a rate that allows the mixer to process them evenly. After all the ingredients have been added and mixed you are ready to feed.

If the mixer stops running with the PTO still turning, a shear bolt may have been broken indicating an excessive torque situation which must be corrected. The Shear Bolt Assembly is located near the front of the mixer on the PTO drive shaft on trailers or behind the GTD connected to the driveline on truck models. Replace the bolt only with a grade 2 shear bolt. Any other grade bolt may result in voiding the mixers warranty.

Truck Operation: PTO Control

Truck Operation

During the unloading operation the mixing augers must be in operation to move the feed to the discharge door. This is accomplished by engaging the PTO of the truck by turning on the PTO switch on the control box for automatic transmissions or for manual transmissions depress the clutch and activate the PTO control.

Discharge: Truck mounted triple auger w/ drop chute magnet

Using the joystick control lower the discharge chute to the desired height and then open the discharge door to allow the feed to flow to the discharge.

When the discharge door is opened the magnetic switch operates an electric valve which sends fluid to the hydraulic motor. When the fluid flows through the motor it rotates the discharge augers. Put the truck in gear and drive along the feed bunk. The operator will need to determine the proper speed of the truck, distance from the feed bunk for the desired chute height, and how far open the discharge door should be for the speed of the truck.

To stop feeding one pen and go to the next simply close the discharge door completely. This turns the discharge augers off. Raise the drop chute and turn off the PTO.

To begin feeding the next pen, engage the PTO, lower the drop chute, and open the discharge door which allows the feed to flow into the discharge and starts the discharge augers rotating.

To stop the unloading process close the discharge door. Lift the drop chute to the full upright position and shut the PTO off.

Trailer Operation

During the unloading operation the mixing augers must be in operation to move the feed to the discharge door. This is accomplished by engaging the PTO of the tractor. Using the hydraulic control, of the tractor, connected to the drop chute, lower the discharge chute, leaving the control in this position will allow the discharge augers to rotate.

Model 425 trailer (discharge not installed)

The discharge chute cylinder and the hydraulic motor used to run the discharge augers are connected together to operate both. To begin feeding open the discharge door to the desired height. This will allow the feed to flow to the discharge. Put the tractor in gear and drive along the feed bunk. When doing so, the tractor should be operated at the rated PTO speed and lower gears used to achieve the proper ground speed. The operator will need to determine the proper speed of the tractor, distance from the feed bunk for the chute height, and how far open the discharge door should be for the speed of the tractor.

To stop feeding one pen and go to the next simply close the discharge door, raise the drop chute, and stop the PTO from running.

To begin feeding the next pen, start the PTO, lower the drop chute, and open the discharge door.

To stop the unloading process close the discharge door. Lift the drop chute to the full upright position and shut the PTO off.

Stationary Mixer with Locking Hand Wheel Manual Discharge

Stationary Operation

During the unloading operation the mixing augers must be in operation to move the feed to the discharge door. This is accomplished by turning on the drive motor for the mixer. To unload the mixer use the hand wheel to open the discharge door and use the locking handle to hold the door in place while unloading. To stop unloading the mixer hold the hand wheel to prevent the door from shutting rapidly and release the locking handle. Let the discharge door close to stop the flow of feed and turn the electric motor off.

Overnight or Short Term Storage

Never allow feed ration or water to remain in the mixer or discharge. If feed or water is allowed to remain in the mixer the metal will deteriorate due to the corrosive nature of the feed. Also, during periods of freezing temperatures the ration may freeze causing serious damage to the unit. The unit should be completely emptied and cleaned prior to storage. There are two drain plugs located in the rear portion of the mixer bottom that may be removed for cleaning.

Mixer Tub Drain

Scale Junction Box

Scale Operations

The detailed operation instructions for your particular scale are supplied in another manual. Please review it prior to use. We recommend a yearly scale system check and recalibration by your local Mixer Electronics Department to catch problems before they become costly and cause downtime. Listed below are several general items that could affect your scale system.

1. Insure the battery cable ends and terminals are clean and making good contact.

2. All electrical connections must be clean and making good contact in the junction box. Also, insure adequate slack in the wires to eliminate pulling or stretching.

3. The battery must be fully charged and the charging system must be in working order. For Trailer mounts with an on board battery, make sure the battery is charged at least once a month or more during the winter.

4. Check the scale wiring for damage and make sure that the wires are well away from hot or moving objects: exhaust, drive lines, etc.

5. Check the scale indicator for any external damage.

6. Check to insure scale stabilizers are free and not binding.

7. Make sure that there are two wires connecting the scale system to the battery. One to the positive terminal and one to the negative terminal.

8. CAUTION!!! If it is necessary to weld on any part of the mixer, truck, or trailer be sure to <u>disconnect</u> the power source to the scale system. Always place the welder ground as close to the welding area as possible. Do not run the welding current through the load cell or weigh bar by connecting the ground to the frame and welding on the mixer. If this is done severe damage may occur to the scale components and would void the scale system warranty.

Maintenance Procedures

Truck Mount

The discharge system consists of several components including the drop chute, augers, and slide door.

Discharge: door, augers, and drop chute

These are hydraulically powered components utilizing electrical controls. The electrical control is located inside the cab and consists of a four way control lever (Joystick). When the lever is activated the hydraulic control valve spools are activated in the fully open position. This will allow the hydraulic fluid to flow to the hydraulic cylinders forcing the cylinder rod to move in or out until the lever is released. Neutralizing or centering the joystick control when operating the discharge door or drop chute will stop the cylinder from moving. To operate the cylinder in the opposite direction you must move the control lever to the opposite position.

Discharge Cylinder Control Valves (FPS)

Discharge Auger Control Valve (Fauver)

Truck Operation: PTO Control

The discharge door and discharge augers are interconnected so that when the door is open electrical power flows through the switch, located on the door guide, to activate the hydraulic solenoid valve allowing hydraulic fluid to flow to the hydraulic motor.

Discharge Door Cylinder: Magnetic Switch

terminal

Discharge: Hydraulic Motor

This motor drives the discharge augers causing them to rotate. When the discharge door is fully closed the electrical power is cut off to the hydraulic solenoid valve which stops the flow of hydraulic fluid to the hydraulic motor.

Hydraulic fluid is supplied to the discharge door and chute through an engine mounted pump. This pump obtains its fluid from the hydraulic reservoir mounted on the front of the mixer. The fluid flows from the pump to the electrically operated control valve to the hydraulic cylinders and back to the hydraulic reservoir.

The hydrualic fluid used to power the discharge augers comes from the hydraulic reservoir and is returned to this reservoir. The pump used to drive the hydraulic discharge motor has a maximum capacity of 11 gallons per minute at 1000 RPM and is located on the lower rear portion of the GTD. The pump provides fluid to the solenoid control valve. When the discharge door is closed the fluid supplied to the valve is returned to the reservoir. When the discharge door is open the fluid flows through the valve, through the 90 PSI check valve, through the hydraulic motor, and back to the reservoir. The electric control valve has a pressure adjustment that is factory set at 2000 PSI plus or minus 100 PSI and should not be set above 2000 PSI.

When fluid is returned to the hydraulic reservoir it flows through a 10 micron filter located by the tank. This filter must be changed periodically with a clean new filter. Make sure the old filter gasket is removed from the filter adapter.

Truck Hydraulics: Hydraulic Fluid Filter

The reservoir has a sight gauge located on the left side of the tank. The reservoir must be filled to show fluid 3/4 of the way up the sight gauge. The fluid supply has a shut off valve located on the reservoir and must be open when operating the unit.

The main auger drive obtains its power from the truck PTO which is usually mounted on the side of the transmission. This PTO drive is controlled from the truck cab and can be electrically or manually operated. Consult your dealer for PTO operation.

The drive line from the PTO attaches to the bottom shaft of the GTD drive which is located at the front of the mixer. The GTD reduces the PTO speed by 50% through a notched drive belt and pulley arrangement. The GTD is mounted on a pivot mount which allows the GTD to be rotated to clear the frame and drive line when installed on various models of trucks.

Truck Driveline: Reversing Gear Box

Truck Driveline: GTD

The output shaft goes from the GTD to the planetary gear box located at the rear of the mixer. On some truck models a reversing gear box is necessary to correct rotation. This gear box is found between the GTD and the planetary gear box. The location and number of hanger bearings and U-joints will vary by model and installation. However, you should always insure all drive line bearings, crosses, and slip splines are greased regularly to prevent binding which may cause drive line failure or false scale readings.

Trailer Models

The trailer models use the tractor's hydraulic pump and control valves to operate the discharge door and drop chute. The discharge augers are powered by a hydraulic motor connected with the drop chute. After the drop chute is fully lowered the fluid is diverted to the hydraulic motor causing the augers to turn. When raising the drop chute fluid is stopped from rotating the augers backwards by a one way check valve. If you encounter the discharge augers operating in reverse contact your dealer. The discharge door is controlled by two separate hoses. One to make the door open and the other to close the door.

Discharge: Bearings, drive chain, grease lines

Discharge Maintenance

The hydraulic motor drives the discharge augers with the use of drive chain. Be sure to oil the chain regularly to extend the chain life. On certain discharge styles a chain tensioner is used for taking up excess chain slack. The auger bearings can be greased by locating the grease bank on the front side of the discharge with grease lines going to the bearing housings. Keep the bearing housings filled with grease. There are two bearings found in the bearing housing and to keep adequate lubrication to both bearings force the grease through the bearings until the grease is visible by the bearing cap on the inside of the discharge. By greasing the bearings in such a manner, water and contamination will be forced out of the bearings adding life to the bearings. Also, to increase bearing life it

is necessary to keep water from accumulating in the bottom of the discharge. To clear the water from the unit you should open the clean out slides or holes at the bottom of the discharge allowing the water and other material to drain out. In severe applications it may be necessary to grease these bearings daily due to high usage or in heavy moisture conditions.

For mixers with grease zerks located on the drop chute hinge, grease the hinge periodically to insure smooth operation.

Roller Chain

Roller chain is recognized as an exceptionally dependable means for the positive transmission of power. To assure optimum performance and maximum efficiency, it is desirable to anticipate the occasional need for chain replacement, therefore, avoiding unexpected interruption or delays in operation. Joint wear, overload conditions, metal fatigue or pitch elongtation will limit the useful life of any chain, therefore, the following information will aid in determining when chain replacement is advisable. During operation, chain pins and bushings slide against each other as the chain engages, wraps, and dissengages from its sprockets. Even when the parts are well lubricated, some metal to metal contact does occur, and these parts

Rear Drive: Roller Chain

eventually will wear. This progressive joint wear elongates chain pitch, causing the chain to lengthen and ride higher on the sprocket teeth.

The number of teeth in the large sprocket determines the amount of joint wear that can be tolerated before the chain jumps or rides over the ends of the sprockets teeth. When this critical degree of elongation is reached, the chain must be replaced.

Determination of Chain Wear

An evaluation of a chain's useful service life requires an analysis of pitch elongation. By placing a certain number of pitches under tension, elongation can be measured. When elongation equals or exceeds the limits in Table 1, the chain should be replaced.

1. Remove chain from sprockets and lay on a smooth, horizontal surface or suspend vertically. To remove the slack from a chain in a horizontal position refer to Table 2 and apply the load indicated for that size of chain. If the chain must be measured while on the sprockets, remove the slack on a span of chain and apply sufficient tension to keep the chain taut.

Table 1

Maximum Elongation Limits						
Chain Number ANSI	Pitch in Inches	Number of Pitches	Nominal Length	Number of Teeth in the Largest Sprocket		
				0-67	68-73	74-81
				Max. Elongation (Inches)		
60	.75	16	12.0	12.38	12.34	12.31
80	1.00	24	24.0	24.75	24.69	24.63
100	1.25	20	25.0	25.75	25.69	25.63
120	1.5	16	24.0	24.75	24.69	24.63
140	1.75	14	24.5	25.25	24.19	25.13

Table 2

Chain Measuring Chart	
Chain Number	Measuring Load in Pounds
60	70
80	125
100	195
120	289
140	386

2. When the chain is properly tensioned, consult Table 1 for the number of pitches which should be measured. The number is determined by the chain size and number of teeth in the largest sprocket. Pitches should be measured from center to center of the pins. If the chain has offset links, do not include them in the measured segment.

3. Select the appropriate column according to the number of teeth in the largest sprocket and compare the published figure with the measurement taken. If the measurement equals or exceeds the figure in Table 1, the chain should be replaced. If a chain breaks or fails due to broken pins, sidebars, or rollers, emergency temporary repairs may be done to avoid a long shut down. However, replacement of the entire chain is preferred for the following reasons:

A. If one section of a chain has broken due to fatigue,

other sections probably have suffered fatigue damage as well and are subject to early failure.

B. If the chain has been broken by a single high overload, parts other than those at the point of failure are usually bent or severely weakened.

Installing New Chain

Before installing a new chain carefully check the teeth on the sprocket. If the teeth are worn to a hooked shape, the sprockets should be replaced to assure full capacity performance and a satisfactory life from the new chain. Proper tension is essential when installing new chain. Tight chain causes an additional load which increases wear on chain joints, sprockets, and shaft bearings. Slack chain produces vibration which may result in excessive chain wear, noise, or shock loading.

Sprocket Inspection

Check for these common sprocket problems which lead to replacement.

1. Wear on the sides are due to misalignment.
2. Tooth wear (indicated by hooking).
3. Broken teeth.
4. Cracks that might lead to failure.
5. Wobbling of sprockets on the shaft.

GTD
(Greater Torque Drive)

There are four bearings located on the GTD which should be lubricated. When lubricating these bearings consult the procedures noted in the Grease-Bearing section.

The unit incorporates a notched drive belt which should be checked for wear or damage. The belt is designed to operate in an open environment therefore the bottom of the unit is open to allow for inspection of the belt without removing the shield. With the mixer empty, the transmission in neutral, the wheels blocked, and the engine off you can rotate the input shaft by hand and visually check the belt for damage. Replace the belt if it shows any cuts or other damage.

Grease-Bearings

For the best results the grease should be pumped into the bearings slowly until a very slight bead of grease forms around the bearing seals on the shaft. This bead, in addition to acting as an indication of adequate relubrication, provides additional protection against the entry of foreign matter. To prevent premature bearing failure, always insure the grease zerk, grease gun end, and the grease are clean and free of any dirt, grit, paint, or foreign matter.

Reversing Gear Box

Planetary Gearbox

To check the oil in the gearbox remove the check plug(s) located on the side of the gearbox. Add appropriate oil until it reaches the level of the check plug.

To drain the oil remove the drain plug(s) located on the bottom of the gearbox. Always replace the drain plug(s) and tighten immediately after the oil is drained. Refill per the above instructions with the correct oil found in the lubrication specification chart.

Reverser Gearbox

To check the oil in the gearbox remove the check plug located on the front side of the gearbox approximately 5" up from the bottom of the box. The oil should be at this level. To drain remove the drain plug located on the bottom of the gearbox and replace plug when finished. Refill with the correct oil, found in the lubrication specification chart, to the proper level.

PTO Drive Shaft
(Trailer Models)

It is important that the owner/operator read this section and the information supplied by the PTO manufacturer. The trailer unit incorporates a PTO coupling shaft containing several important features and warnings:

Planetary Gear Box

1. SAFETY SHIELD These shields should always be left in place at all times to prevent injury.

2. SHEAR BOLT The PTO shaft used on current model trailers utilizes a shear bolt mechanism to protect the tractor and mixer from serious damage. The bolts used for this must be designed for this application or the bolt will not shear during an overload situation. Use ONLY Grade 2 bolts that will shear on the threaded portion of the bolt, available at your local dealer.

3. Do not wear loose clothing when operating the PTO, or when near rotating equipment.

4. When operating stationary PTO driven equipment, apply the tractor parking brake lock and block the rear wheels front and back.

5. To avoid injury, do not clean, adjust, unclog or service PTO driven equipment when the tractor engine is running.

6. Never exceed the recommended operating speed for the particular equipment in use.

7. PTO shafts must only be used for their intended purpose and are designed for only that machine.

8. Pull locking collar and simultaneously push PTO drive shaft onto PTO shaft until the locking device engages. Ensure that the PTO shaft is securely connected before use.

9. The maximum joint angles must be observed or serious injury and damage could occur.

Continuous operation	- 25 Deg.
Short Duration	- 80 Deg.
Non-rotating	- 80 Deg.

10. Avoid contact between the PTO shaft and tractor or implement.

11. The chain is intended to prevent the shield from rotating against non-moving parts and thereby preventing shield damage. A properly installed chain will increase the service life of the shield.

12. Chains must be fitted so as to allow sufficient articulation of the shaft in all positions. Care must be taken to be sure that chain does not become entangled with drawbar hitch or other restrictions during operation or transport of machine.

13. The PTO drive shaft must not be suspended from the chain.

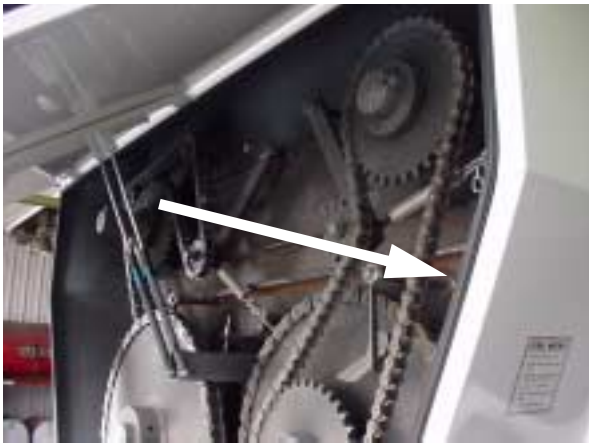
14. Lubricate with quality grease before starting work and every 8 operating hours. Clean and grease the PTO drive shaft before each prolonged period of non-use. The molded nipples on the sheild near each bearing are intended as grease fittings and should be lubricated every 8 hours of operation. Telescoping members must have lubrication to operate successfully regardless of whether a grease fitting is provided for that purpose. Telescoping members without fittings should be pulled apart and grease should be added manually. Check and grease the guard tubes in winter to provent freezing. Insure that the tractor and trailer are at less than a 15 degree turning angle before lubricating the CV portion of the PTO.

Rear Drive Compartment

The Rear Drive Compartment or Oil Bath Compartment encloses the chain and sprockets used to drive the mixing augers. This dual purpose design keeps out dirt and other contamination as well as providing a sealed oil bath for the chains and sprockets. The utilization of this compartment as a sealed oil bath system is at the discretion of the customer as he may elect to manually lubricate the chain or use the oil bath system. Listed below are maintenance procedures for both methods. Whichever method is used, it is important to maintain the components and doors to insure they are properly sealed.

Door Adjustment

The doors have numerous adjustable clamps that hold the door and door seal tight against the frame. The door clamps should be adjusted evenly and so that they hold the door and door seal up to the frame plus a preload of 3/16 inch. If the door seal becomes damaged or compressed to a point where it will not seal it should be replaced and the doors readjusted.



Rear Drive: Door Seal

Manual Oil Method

If it is decided to lubricate the chain manually the lubrication period should be as the maintenance schedule suggests. The mixer unit must be stopped and oil applied using an oil can or oil soaked brush. Apply an adequate amount of oil to coat the chain completely. After application of the oil, close the doors and operate the unit for five minutes to work the oil into the chain.

Oil Bath Method

If the unit is to be used as an oil bath system, you should insure that the oil drain plug is installed in the bottom of the oil sump and the enclosure is free of any contamination or obstruction. Fill the enclosure with oil to the center line of the lowest drive gear. To check the oil level, open the rear door after the unit is stopped.

Grease-Auger Bearings

The rear auger drive bearings have a grease zerk bank located on the left rear portion of the unit. The front auger bearings are located on the front of each unit and are greased individually. For best results, the grease should be pumped into the bearing slowly until a very slight bead forms around the bearing seal. This bead, in addition to acting as an indication of adequate relubrication, provides additional protection against the entry of foreign matter. To prevent premature wear or failure, always insure the grease zerk, grease gun end, and grease are clean and free of any grit, dirt, paint, or foreign matter.

Rear Drive: Grease Zerks

Front Auger Bearings

MAINTENANCE SCHEDULE

The following items are to be checked and if necessary corrective action taken. This schedule is designed for units operating under normal conditions. If the unit is operating in adverse or severe usage conditions it may be necessary for the items to be checked and serviced more frequently.

Check and Inspect the Following	8 HRS	50 HRS	500 HRS
Auger Drive System			
PTO Bearings, Slides, Crosses Lubrication		*X	
Planetary & Reverser Gearbox Oil Level		X	
Planetary & Reverser Gearbox Drain & Refill			**X
Oil Bath Level		X	
Oil Bath Drain & Refill			**X
Main Auger Bearing Lubrication		*X	
Chain, Sprockets for Wear & Adjustment		X	
GTD Belt for Wear or Damage		X	
GTD Bearing Lubrication		X	
Discharge System			
Chain, Sprockets, & Bearings for Wear & Adj.		X	
Bearing Lubrication		*X	
Spout Hinge Lubrication		*X	
Drain Holes Cleared	X		
Hydraulic System			
Hydraulic Fluid	X		
Hydraulic Fluid Drain & Refill			**X
Leaks in System	X		
Hydraulic Filter Change			**X

* In severe conditions these items may require daily service.
** Drain and refill after the first 100 hours.

Stationary units are in many ways the same as a basic mixer, and should be operated and seviced as such, according to this Operators Manual.

The basic parts on a stationary mixer to be serviced:

1. Drive System
   - A. Chain
   - B. Sprockets
   - C. Belts & Sheaves

2. Auger Bearings

3. Oil Bath Maintenance

4. Scale System

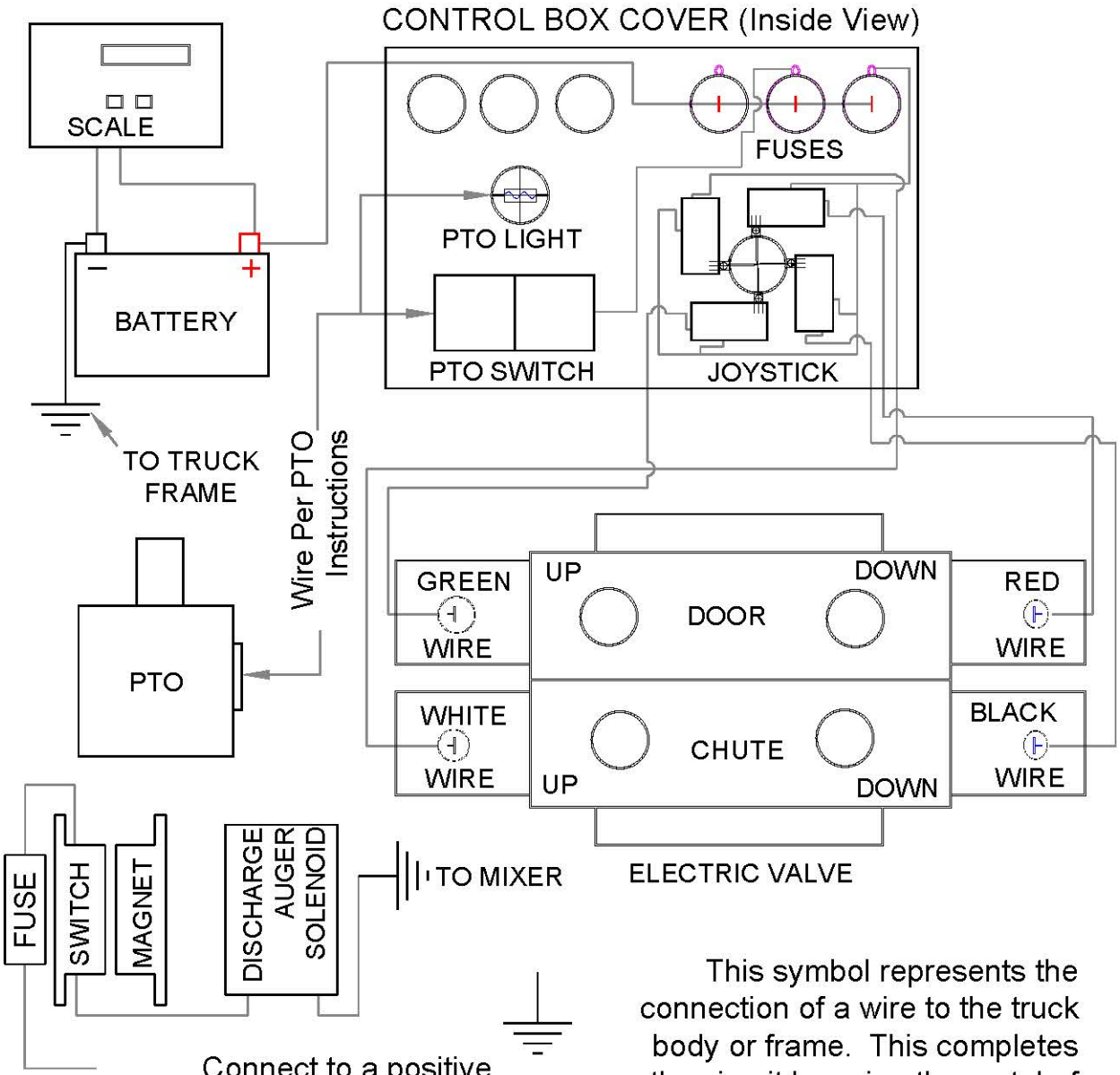
5. Discharge Door Assembly

6. Hydraulic System (Discharge Door) if Applicable

Note: For special application parts to be replaced, contact your local dealer.

Stationary Mixer with Locking Hand Wheel Manual Discharge and Weigh Bar type scale system.

HARSH
TRUCK MOUNT
ELECTRICAL DIAGRAM



Connect to a positive terminal on the ignition switch. Power must only flow when the key is ON.

This symbol represents the connection of a wire to the truck body or frame. This completes the circuit by using the metal of the truck to create an electrical path to the negative side of the battery.

Harsh Mobile Mix Limited Warranty

Harsh International warrants each new Harsh Mobile Mix Feeder or Harsh Stationary Mixer to be free from defects in material and workmanship for a period of one year from date of delivery. This warranty does not extend to any claim arising from or occasioned by any misuse, neglect, improper installation, overloading, failure to properly operate and maintain, or introducing into the mixer materials uncommon to normal mixing. Further, the warranty does not extend to mixers or parts thereof which have been altered or repaired at places other than the Harsh factory, nor shall the warranty apply if any acccessories other than Harsh accessories or those sold by Harsh have been affixed.

Warranty Notice Required. In order to submit a claim or violation of the within the limited warranty, written notice to Harsh must be given at its factory in Eaton, Colorado, 80615, within the one year warranty period. Within such written notice the buyer must submit a request for a Return Goods Authorization. Upon receipt of the Returned Goods Authorization, the buyer will return the material which is claimed to be defective to Harsh, F.O.B. its plant within 30 days after the buyer has received the Returned Goods Authorization. Thereafter, Harsh, at its election, shall either (a) repair, (b) replace or (c) repay the price thereof.

Warranty Validation Certificate Required. The warranty provided herein shall not take effect until the application and registration form (Warranty Validation Certificate), which is provided at the time of purchase and installation is completed by the owner and returned to Harsh. Harsh does not transfer to any of its dealers, distributors, or agents the right to warranty on its behalf. If said dealer or distributor in performing a service or repair, returns to the Harsh factory on behalf of the buyer, such parts or mixer, the existence, validity and applicability of the warranty regarding such part or mixer remains solely the prerogative of Harsh and not such dealer or distributor.

Limitation of Remedy. The remedies provided herein shall be the sole and exclusive remedies available to buyer, its heirs, successors and assigns. If such limitation is unenforceable, than notwithstanding anything herein to the contrary, tha maximum damages for which Harsh may or shall be liable shall be the sales price for the part, component or assembly, claimed to be defective. Harsh shall not be liable for consequential damages including loss of profits, personal injury or death, property damages or any other commercial loss arising out of any claimed failure or defect of the Harsh product.

Exclusive and Sole Warranty. The warranty provided herein is the sole and only warranty and there is no warranty of merchantability, fitness for a particular purpose, warranty arising from a course of dealing or usage of trade or any other implied or express warranty except made specifically provided herein.

Harsh does not assume responsibility for shipping or travel expenses and reserves the right to make improvements to any model without notice.

IMPORTANT NOTICE

To enable us to better serve your needs, please fill out the following waranty information and return this page to Harsh International. This allows Harsh to transfer your information into our computer system. With this information we can bring up your records with all the current invoicing, serial numbers, or model numbers needed for future reference.

Thank You

Harsh Internatinal, Inc.
600 Oak Street
Eaton, Colorado 80615

WARRANTY VALIDATION CERTIFICATE
&
DELIVERY CHECKLIST

In order to insure the unit is delivered to the customer in a fully operational condition please fill out the following inspection form and return it to Harsh International. This form must be returned to Harsh prior to processing any customer warranty claims.

Hydraulic System
- ( ) Oil Tank Level
- ( ) System Leaks
- ( ) Operation of System & Controls
- ( ) Engine Mount Pump

Drive System
- ( ) PTO Control Operation
- ( ) Bearings Lubricated
- ( ) Chains Lubricated
- ( ) Gearbox Levels
- ( ) Main Augers & Tub Clear of Obstruction

Discharge System
- ( ) Chains Adjusted
- ( ) Spout & Bearings Lubricated
- ( ) System Control Operational

- ( ) Safety Instructions have been read, demonstrated, and clearly understood.

Notes & Comments: _____

_____

Owners Name: _____
Address: _____
City, State: _____
Zip Code: _____
Phone Number: _____
Delivery Date: _____ SERIAL NUMBER_____

The above items have been checked and performed per the instructions in the operators manual. The manual has been received and delivered to the owner.

_____ _____
Signed by Dealer/Representative Signed by Customer

(Specifications Subject to Change Without Notice)

NOTES