

Serial # 1883094 to 2999112

ROTO GRIND

OPERATOR and PARTS MANUAL MODEL 1090 TUB GRINDER



BURROWS ENTERPRISES, INC.
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www.rotogrind.com

TABLE OF CONTENTS

LIMITED WARRANTY	3
TO THE OWNER	4
SAFETY DECALS	6
SAFETY DECAL LOCATIONS	7
GENERAL OPERATION	8
MAINTENANCE	11
LOAD SENSING SWITCH	11
TORQUE SPECIFICATIONS	12
LOAD SENSOR WIRING DIAGRAM	13

PARTS LISTING:

MAIN DRIVE ASSEMBLY	14
HYDRAULICS AND GOVERNOR	15
TUB AND SHIELDS	16
ROTOR ASSEMBLY	17
WHEEL AND HUB ASSEMBLY	18
SPOUT ASSEMBLY	19
PTO DRIVE LINE ASSEMBLY	20
MILL HOUSING PARTS AND ACCESSORIES	21
CORN AND GRAIN ATTACHMENTS	22
BALE TURNER ATTACHMENTS	23

LIMITED WARRANTY

The Burrows Enterprises Incorporated warrants products sold by it to be free from defects in material and workmanship for a period of one (1) year for agricultural applications and for a period of ninety (90) days for industrial applications after the date of delivery to the purchaser subject to the following conditions:

1. Burrows Enterprises Incorporated obligation and liability under this warranty is to repair or replace at the company's option, any parts which upon manufacture were defective in material or workmanship.
2. All parts and repairs under this warranty shall be supplied at an authorized Burrows Enterprises Incorporated dealer or at the factory at the option of Burrows Enterprises Incorporated.
3. Burrows Enterprises Incorporated warranty does not extend to the parts and elements not manufactured by Burrows Enterprises Incorporated and which carry the warranty of the other manufacturer.
4. Transportation or shipping to an authorized dealer for necessary repairs is at the expense of the purchaser.
5. Burrows Enterprises Incorporated makes no other warranty express or implied and makes no warranty of merchantability or fitness for any particular purpose beyond that expressly stated in this warranty. Burrows Enterprises Incorporated liability is limited to the terms set forth in this warranty and does not include any liability for direct, indirect, incidental or consequential damages or expense of delay and the company's liability is limited to repair or replacement of defective parts as set forth herein in the warranty.
6. Any improper use, including operation after discovery of defective or worn parts, operation beyond rated capacity, substitution or not approved by Burrows Enterprises Incorporated, or any alteration or repair by other than an authorized Burrows Enterprises Incorporated dealer, which affects the product materially and adversely, shall void warranty.
7. No dealer, employee, or representative is authorized to change warranty in any way or grant any other warranty unless such change is made in writing and signed by an officer of Burrows Enterprises Incorporated at its home office.
8. Some states do not allow limitations on how long an implied warranty lasts or exclusions of or limitations on relief such as incidental or consequential damages so the above limitations may not apply to you. This warranty gives you specific legal rights and you may have other rights, which vary from state to state.

INFORMATION FOR ORDERING PARTS

OWNERS NAME: _____

ADDRESS: _____

DEALERS NAME: _____

ADDRESS: _____

SERIAL NUMBER: _____

(FOR LOCATION SEE PAGE 6)

DATE PURCHASED: _____

Burrows Enterprises Incorporated reserves the right to make changes or add improvements to its products at any time without incurring any obligation to make such changes to products manufactured previously. Burrows Enterprises Incorporated, or its dealers, accepts no responsibility for variations, which may be evident in the actual specifications of its products and the statements and descriptions contained in this publication.

TO THE OWNER

This Burrows Unit is the finest equipment made and the purpose of this manual is to assist you in realizing the benefits you anticipated when you purchased this unit. Many people have contributed to the production of this product. They all have an interest in its successful performance and we are providing this manual to give you the benefit of the experience we have gained thorough the years of building and testing this equipment. The way you operate and care you give this unit will have much to do with the successful performance of this unit. This operator's manual has been carefully prepared and illustrated to make it as easy as possible for you in the operation of your unit. It will pay you to read the entire manual carefully and familiarize yourself with all operations "before operating" the unit. For further information call or write:

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www.rotogrind.com

SPECIAL PRECAUTIONS

1. Do not climb on, or stand on the unit when it is turned by the P.T.O of the tractor. All moving parts are guarded for your protection but foreign objects such as rocks and pieces of iron can be thrown out of tub as it runs empty of material.
2. Leave all shields and guards on the machine while operating. They are for your protection and removal of them will hinder the operation of the machine. Warranty is void if the machine is operated with any of the shields missing.
3. The ROTO GRIND is designed to be turned at 1000 R.P.M. with tractor power take off. Do not, under any circumstances, turn the mill over 1250 R.P.M. or serious damage could result to the machine. Do not operate at 540 R.P.M. unless application is approved in writing from a Burrows Ent. Inc. officer. Failure to operate at the correct R.P.M.'s will void warranty.
4. The ROTO GRIND is designed to grind roughage materials either loose or baled. The machines are equipped with twine guards and will keep almost all of the sisal twine from wrapping on the rotor shaft if they are adjusted properly, however the shaft should be checked periodically for twine build up and removed if any has accumulated.
Plastic twine should not be ground because it is not only non-digestible, it is more likely to wrap on the rotor shaft. Any plastic twine build up will create heat and melt into a solid lug that can only be removed by burning it off.
5. In loose material, the ROTO GRIND will operate with more capacity if the size of the bites of material being loaded is small enough to fit in the tub. Do not allow material to hang over the side of the tub. This will cause a bridging effect and will slow up grinding.
6. Do not attempt to grind foreign materials such as rocks, brick, dirt, sand, any type metal pieces or products, tree branches over 3" in diameter, glass, or ceramics. These products can damage the machine and void warranty.

WORK SAFELY – FOLLOW THESE RULES



This safety alert symbol identifies important safety messages in this manual. It means --ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED! When you see this symbol, be alert to the possibility of personal injury and read the message that follows

A CAREFUL OPERATOR IS THE BEST INSURANCE AGAINST AN ACCIDENT.

- Review this entire manual.
- Do not wear loose-fitting clothing, which may catch in moving parts.
- Use extreme care when making adjustments. Shut off machine before making adjustments. Shut off tractor and put key in your pocket.
- After servicing, be sure all tools, parts, or servicing equipment are removed from the machine.
- Keep all safety shields in place.
- Make sure that there is no one near the machine before operating.
- Be sure that the correct power take-off parts are used and that, they are properly secured.
- Be sure the tractor power take-off is disengaged before starting the tractor engine.
- Review all safety decals.
- Securely block unit before working on it.
- When working with flammable materials, be sure you do not smoke.

DURING OPERATION:

- No one other than the operator should ride on the tractor.
- Do not attempt to remove any obstructions while operating the machine. First shut off tractor and put key in your pocket.
- Always disengage the P.T.O., before transporting. Do not open any covers and expose the rotor while they are rotating.
- Shut off tractor engine and be sure to wait until all moving parts have come to a complete stop before adjusting, cleaning, or lubricating.

- Keep hand, feet, clothing and object away from moving parts.
- Use extreme care when transporting over uneven or rough terrain.
- Keep shields in place and in good condition.
- Keep children away from machine in operation.
- Have your fire extinguisher checked at regular intervals and place it in a position on the unit where it is readily accessible without reaching over or around moving parts.
- Crop materials often have an extremely high rate of flammability, which increases the possibility of fires. A decrease in the risk can be attained by, stopping the machine, shutting the tractor off, and removing the key from the ignition and placing it in your pocket. Then proceed to remove accumulations of material from the tractor, and the machine. Now check for any parts that may be overheating.

ON-HIGHWAY OPERATION - TRANSPORTING:

- Check clearance carefully before towing the machine over bridges and into buildings.
- Always place the machine in the transport position.
- For daytime and nighttime, accessory light and devices should be used for adequate warning to operators of other vehicles.
- Comply with your state and local laws governing highway safety, and with regulation when moving machinery on a highway.
- Drive at a reasonable speed to maintain complete control of the machine at all times.
- When transporting on the highway, always use a safety chain between the towing vehicle and the machine.

SAFETY SIGNS

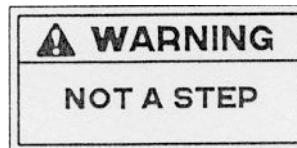
Located at strategic points on this machine are safety signs. These signs warn you of potential dangers if the warnings on the decals are not followed.



1 – ROTO GRIND
Part # 224-09



#2 – ARROW
Part # 224-05



#3 – WARNING NOT A STEP
Part # 224-114



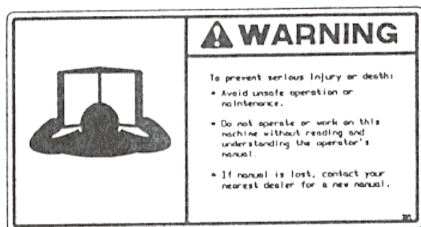
4 – CAUTION – 1200RPM
Part # 224-113



5 – CAUTION
KEEP SHIELDS IN PLACE
Part # 224-07



6 – WARNING
THROWN OBJECT HAZARD
Part # 224-03



7 – WARNING – AVOID UNSAFE
OPERATION OR MAINTENANCE
Part # 224-01



8 – WARNING –
HIGH PRESSURE FLUID HAZARD
Part # 224-02



9 – WARNING
MOVING PART HAZARD
Part # 224-04



10 - WARNING
KEEP SHIELDS IN PLACE
Part # 224-117



11 – WARNING STAY OFF MACHINE
Part # 224-06

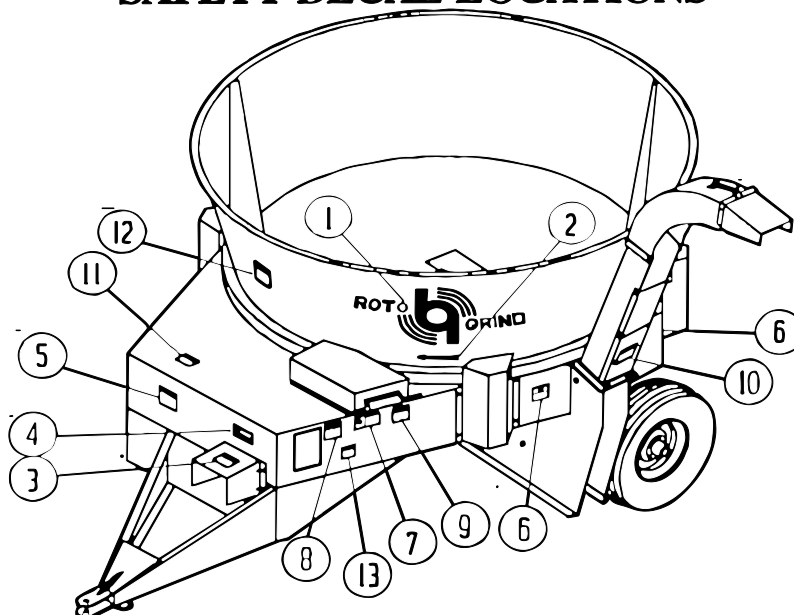


12 - WARNING
INSIDE STEP
Part # 224-08



13 – WARNING
12 VOLTS ONLY
Part # 224-10

SAFETY DECAL LOCATIONS



The terms Front, rear, right side, and left side are defined as standing behind the machine and facing in the direction of forward travel.

The delivery form in the rear of the operator's manual must be completed and returned to the factory in order to establish proper warranty.

GENERAL OPERATION

IMPORTANT: BEFORE USING, WITH PTO DISENGAGED AND TRACTOR ENGINE STOPPED (KEY IN POCKET), INSPECT THE MACHINE AND REMOVE ANY FOREIGN OBJECTS, WHICH MAY HAVE FALLEN INTO THE MACHINE DURING TRANSIT.

CAUTION: NEVER PUT YOUR HANDS INSIDE OF THE MACHINE DURING OPERATION, OR PERFORM ANY KIND OF AN ADJUSTMENT, LUBRICATION, OR REPAIR TO THE MACHINE WITHOUT SHUTTING OFF THE TRACTOR IGNITION AND PLACING KEY IN POCKET. KEEP CHILDREN AWAY FROM MACHINE WHILE IN OPERATION.

When corresponding with the company, distributor, or dealer regarding this machine, please specify both the model number and the serial number.

1. **SHEAR PLATES:** These parts, in the mill housing assembly, control the fineness of grind of the material. They are individually adjustable and for a very fine grind it is recommended that all of the shear plates be positioned as close to the end of the hammers as possible. When coarser grinds are required, move the top shear plate out first.

EXAMPLE: Top plate all the way out, the next plate, three quarters of the way out; the next one, half way out and the fourth one down from the top, one quarter of the way out. Moving the top plates out before the bottom ones, makes the unit pull easier with less shock loads.

2. **ADJUSTABLE RISER:** Can be operated from the rear of the machine with the hand crank, For tough grinding, or low horsepower, adjust the riser up by turning handle clockwise, for easier grinding. For higher horsepower and more capacity, lower the riser by turning the crank handle counter clockwise. Range is from 5" to 9" above the floor. Adjust in conjunction with the tub speed and how often the governor / speed sensor kicks in and out.
3. **HYDRAULICS:** Tractor hydraulics is used to turn the tub. There is an adjustment dial mounted on the left front of the machine that is a pressure compensated flow divider to control the rotation of the tub. This is to be used in conjunction with the height of the riser to match the grinding speed to the tractor horsepower. Try to avoid constant, very slow turning of the tub as this means that most of the oil is going through the pressure side of the flow divider and tends to heat the oil. If the tub is turned very slowly, check the hydraulics periodically for heat. (Temperature should be kept below 150 degrees F.)

In the hydraulic circuit there is a normally open solenoid valve plumbed into the circuit between the two hydraulic lines that run from the flow divider to the hydraulic motor. Being a normally open valve, the oil will take the least line of resistance and will dump through this open valve and back to the tractor instead of going through the hydraulic motor, which rotates the tub. The reason the tub will always turn backwards when the direction of the flow is reversed in the tractor is because there is a check valve installed on the "out" side of this solenoid valve. The solenoid valve only works on the one direction of the flow of oil and you would not be able to turn the tub backwards without the check valve installed. **NOTE:** Continuous grinding in the reverse tub rotation is not recommended. The flow divider is also designed to work in one direction of flow and wants to let the tub turn at maximum RPM in the reverse direction.

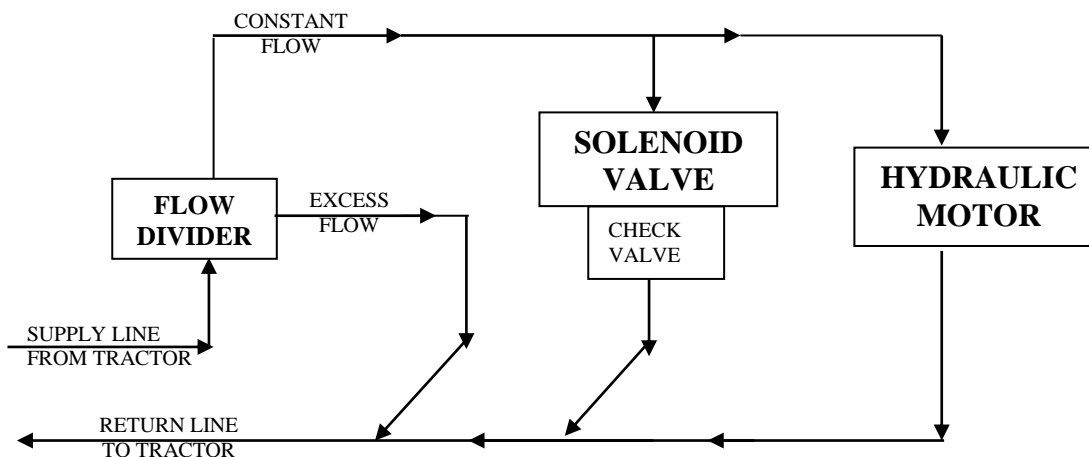
The function of the governor / speed sensor is to send a 12 volt current to the solenoid valve when the desired PTO RPM is reached. This will close the valve and force the oil to go through the hydraulic motor and rotate the tub in the proper clockwise rotation. When a heavy load lowers the PTO RPM, the governor will cut off the 12 volt current to the solenoid valve and allow the valve to return to its normal open position which lets the oil go through it instead of the hydraulic motor. This stops the tub rotation and allows the power unit to return to normal speed at which time the governor will re-introduce the 12 volt current to the valve to close it and the oil will again go through the hydraulic motor to start the tub rotation and resume grinding.

Since the introduction of the " ALFALFA HAMMERS" which are designed to grind good quality alfalfa at 540 RPM PTO speed instead of the normal 1000 RPM, it is necessary to reset the governor / speed sensor to start and stop the tub at the lower RPM. There are some cases where the customer would like to be able to grind at both 540 RPM for alfalfa and at 1000 RPM for other feeds. This requires two front halves of the PTO to be able to switch speeds. The installation of all alfalfa hammers in the machine, produces excessive" blow" at 1000 RPM. We recommend either half alfalfa hammers and half standard hammers or a set of pins to tie the standard hammers to the lead hammer. The reason that the hammers must be pinned together is that at the lower 540 RPM, the lead hammer is not heavy enough to stay extended to tear the material off of the bale. Pinning them together adds the weight of the standard hammers plus the pin to the weight momentum of the lead hammer which will keep it extended at the lower RPM's, and eliminate excess wear on the hammer pin.

NOTE: CAUTION

540-RPM operation is not recommended for tough grass hay grinding. It will rock the hammers back to the point where the hammers will create excess wear, and void your warranty.

ROTO GRIND HYDRAULIC SCHEMATIC



TRACTOR INPUT HYDRAULIC OIL FLOWS THROUGH THE FLOW DIVIDER, SOLENOID & CHECK VALVE UNTIL THE ROTOR REACHES OPERATING SPEED. WHEN OPERATING SPEED IS REACHED, THE GOVERNOR SENDS CURRENT TO THE NORMALLY OPEN SOLENOID. THE SOLENOID CLOSES AND SENDS OIL TO THE HYDRAULIC MOTOR TO ROTATE THE TUB.

4. **POWER TAKE OFF:** The driveline is at a slight angle to the machine. Before starting the grinder, move the front of the tractor to the right to straighten it. If it is not straight at the tractor joint it could cause vibration and serious damage could result.

Always start the machine and check for operation of all parts prior to each day of operation and after transporting. Materials and dirt can pack into the mill while transporting or over a few days when it is windy. To prevent this from “locking” the mill you should step into the tub and roll the mill backwards before you connect the machine to the tractor. Then after the machine has been properly connected to the tractor, set the tractor at low RPM and slowly engage the PTO clutch. If the mill is still “locked”, disengage the PTO, shut off tractor, remove key and place in your pocket, or in absence of key (older model tractors), disconnect the PTO shaft from the tractor. Now step inside of the tub and clean out the mill.

After you have finished grinding and want to shut the machine down, reduce the tractor RPM slowly to an idle and wait for the mill to slow down before disengaging the PTO. Some tractors have a brake on the PTO when disengaged and if disengaged at a high RPM the weight of the rotor may damage the PTO in your tractor. Set your draw bar to the correct operating length of 16” from the end of the PTO shaft on your tractor to the center of the hole in your draw bar. Make sure that the PTO square shaft is at least 8” engaged into the square tube while in operation. If you are not engaged at least 8”, you can cause damage to the PTO, and void the warranty.

DO NOT MOVE THE MACHINE WHILE THE PTO IS IN MOTION. SHORT TURNS WHILE THE ROTOR IS TURNING MAY DAMAGE THE PTO

5. **DISCHARGE SPOUT:** The discharge spout can be mounted to direct ground material to the side of the machine or the back of the machine. The standard spout will allow you to build a pile about 10’ high. There are optional 2’ spout extensions available and a maximum of two can be added to the standard spout. Longer spout usage requires fairly dry material or plugging may occur. An adjustable swivel is now a standard option. Spout extensions should not be added when using the spout swivel.
6. **EAR CORN HOOD:** This attachment is designed for ear corn, bark, or wood chips to be loaded with a front-end loader. It shields the mill to stop the material from being thrown out of the tub. **DO NOT** try to reposition the hood. Caution should be used in loading ear corn. Do not load the machine faster than it can grind. Ear corn turns very hard in the tub and as a result, you should not load the corn more than three feet deep. Over loading will cause excessive hydraulic pressure and tends to heat the hydraulic oil.
7. **GRAIN HOOD:** The grain hood is designed for loading with an auger. It bolts down directly over the hammer mill inside of the tub. It has four more shear plates that allows for an extra fineness of grind. **“IMPORTANT!”** Be sure to disconnect the hydraulic hoses that turn the tub. Tub rotation is not required with this attachment and serious damage could result if it was accidentally turned while the grain hood is installed.
8. **DISCHARGE AIR CONTROL:** (Optional on all models after serial number 1267026 / Feb 1986) Allows you to control the amount of air that is coming out of the spout.

MAINTENANCE

CAUTION: Never put your hands inside of the machine during operation, or perform any kind of adjustment, lubrication, or repair to the machine without shutting off the tractor ignition and placing the key in your pocket. Keep children away from machine when in operation.

1. **LUBRICATION:** The three bearings on the driveline and the PTO should be greased every eight to ten hours of operation. Be careful not to over grease as this pushes out the seals and allows dirt and foreign material to enter the bearing, shortening the bearing life. The tub roller bearings should be greased once a season or every one hundred hours, whichever ever occurs first. **NOTE:** Check the bearings on the driveline every time the unit is greased. If one of these bearings goes bad and the machine is operated, it may cause the driveline to break, causing serious damage to the machine.
2. **HAMMER REPLACEMENT:** The hammer pins have a flat side on one end to fit a “D” hole in the mill rotor. When turning the hammers, remove the snap ring and drive the pin back out of the mill rotor through the holes provided in the mill housing. When the hammers have been turned, replace the snap ring; making sure it is seated in the groove in the pin.
3. **ROTOR REMOVAL:** If for any reason the mill rotor needs to be removed, it is attached to the driveline by two 1/2” shear bolts. Remove the shear bolt and apply rust remover / penetrating oil. Loosen the lock collar on the back bearing and unbolt the front two bearings. Lock the drive line with the PTO, apply forward pressure on the driveline and turn the mill rotor on the shaft. It is a slip fit and should come off without too much difficulty.
4. **SPROCKET ADJUSTMENT:** The alignment of the sprocket to the drive chain should be checked periodically. If mis-alignment occurs, remove the tub roller shields and adjust the tub rollers for proper height. **NOTE:** Mis-alignment will cause excessive wear in the sprocket and the chain on the tub.

Serial #'s 1883094 & Higher / September 2004

5. GOVERNOR ADJUSTMENT ON JEMM SPEED SENSOR

1. Turn the controller power switch to the “OFF” position.
2. Set “ENGINE ADJUSTMENT”, “COURSE” knob on the control box to approximate tractor engine RPM used for grinding.
3. Rotate the “ENGINE ADJUSTMENT”, “FINE” knob to the mid-range. (5)
4. Engage PTO and position throttle at the desired engine RPM.
5. Turn the controller power switch to the “ON” position.
6. Rotate the “ENGINE ADJUSTMENT”, “COURSE” knob clockwise until the tub just starts to turn. This sets the RPM at which the tub starts to turn.
7. Rotate “FINE”, “ENGINE ADJUSTMENT” knob to start & stop tub rotation, leaving it set at the point where tub rotation starts. This fine-tunes where the tub starts to turn.
8. Set “ENGINE DROP” knob to the number representing desired percentage of engine RPM reduction required to stop the tub.

EXAMPLE: If grinding at 1000 RPM, “ENGINE DROP” knob is set at 3, tub rotation will stop when RPM drops to 970 RPM. ($1000 \times .03 = 30 \text{ RPM}$ * $1000 - 30 = 970$)

FRONT PANEL FEATURES / CONTROLS

POWER SWITCH - Turns the BHS3 “ON” or “OFF”

ENGINE ADJUSTMENT KNOBS - Used to calibrate the control for different engine RPM

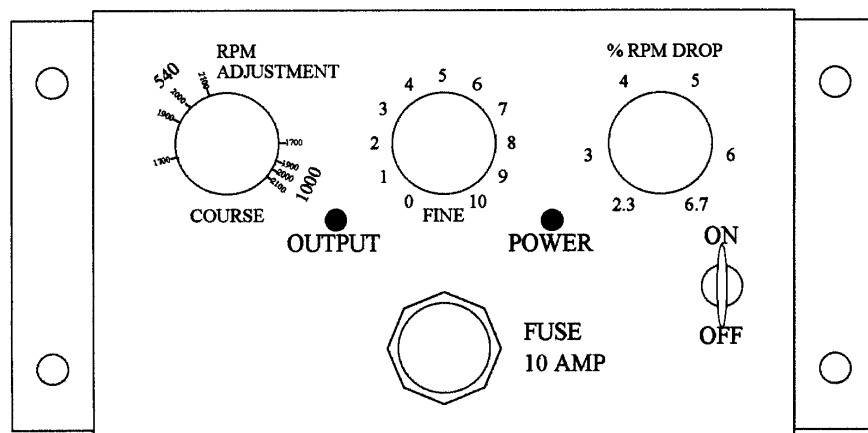
- **Course Dial Overview:** The “COURSE” adjustment allows calibration anywhere between 1500 to 2300 Engine RPM
- **Fine Dial Overview:** The “FINE” adjustment Knob is used during grinding setup and while grinding to set the RPM where the tub starts turning. Tub rotation induces the material grinding process.

ENGINE DROP KNOB – Used to set the amount of engine RPM drop allowed before the controller stops the tub rotation. The “ENGINE DROP” setting automatically tracks the “ENGINE ADJUSTMENT” knob. “ENGINE DROP” markings are in percentage.

OUTPUT / SENSOR LIGHT – This red lamp (LED) is “ON” when there is sufficient input signal present. If this light is “OFF” the signal level is too low, engine speed is too low, or sensor is disconnected.

POWER LIGHT – This green light (LED) comes on when there is power to the box when the switch is on. If it doesn’t light when the switch is “ON” check the power source and fuse.

FUSE HOLDER - Contains a 10 AMP fuse.



TORQUE SPECIFICATIONS

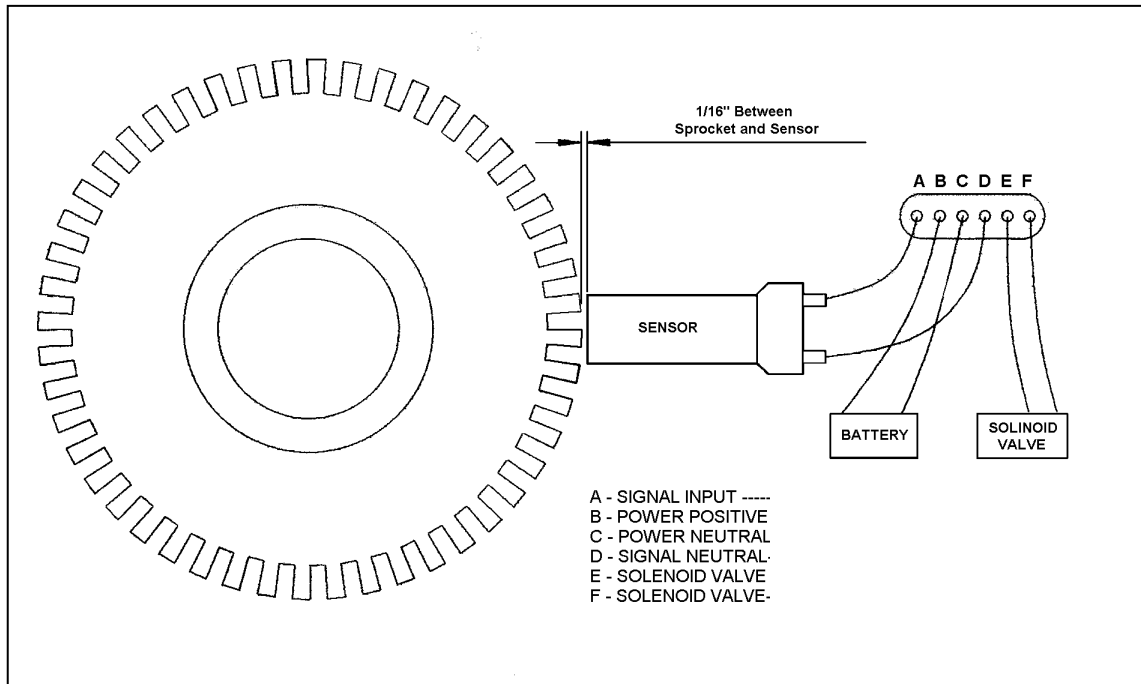
RECOMMENDED TORQUE IN FOOT POUNDS

COARSE AND FINE THREADS

BOLT SIZE	GRADE 5 THREE RADIAL DASHES		GRADE 8 SIX RADIAL DASHES	
1/4	9		11	
5/16	18		23	
3/8	31		39	
7/16	50		63	
1/2	75		94	
9/16	110		138	
5/8	150		188	
3/4	250		313	
7/8	378		473	
1	583		729	

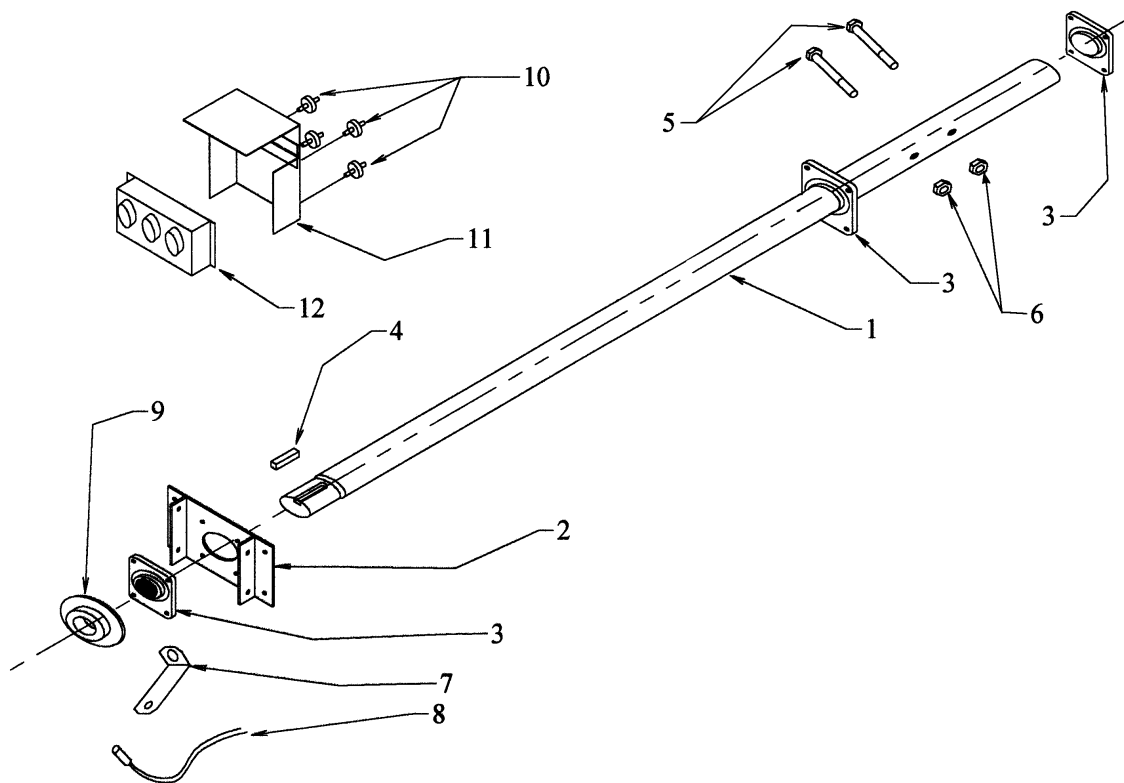
ELECTRICAL WIRING DESCRIPTIONS

The BHS3 has a six-pin connector to connect power input, signal input, and the controller's output. This connector is keyed so that the connector can only connect one way. Each of the six contacts of the connector is labeled with a letter (A-F). All six are used on the BHS3.



WIRING COLOR CODE

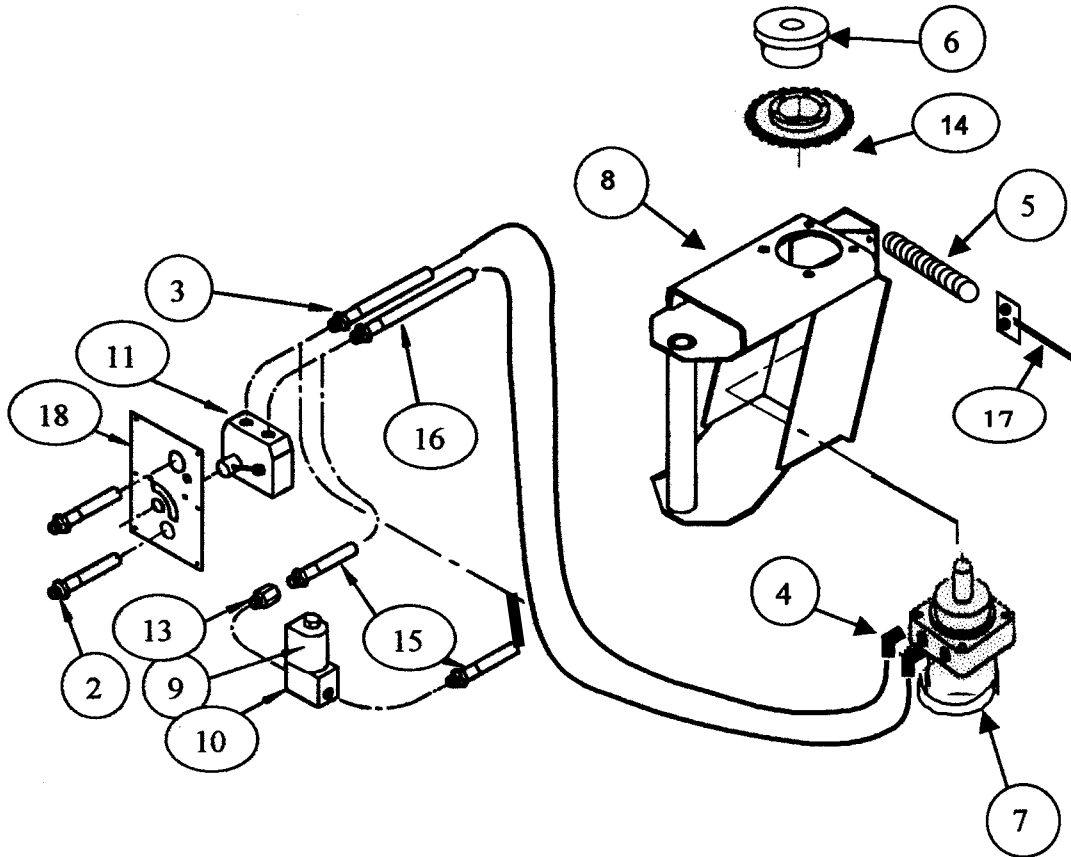
<u>A – SIGNAL INPUT</u>	<u>YELLOW</u>
<u>B – POWER POSITIVE</u>	<u>RED</u>
<u>C – POWER NEUTRAL</u>	<u>BLACK</u>
<u>D – SIGNAL NEUTRAL</u>	<u>GREEN</u>
<u>E – SOLENOID VALVE POSITIVE</u>	<u>BLUE</u>
<u>F – SOLENOID VALVE NEUTRAL</u>	<u>GREY</u>



MAIN DRIVE ASSEMBLY

KEY	PART #	DESCRIPTION
1	682-04	1090 Drive Shaft
2	590-117	Front Bearing Mounting Plate
3	072-445	2" Flange Bearing
4	338-028	3/8"x 2-1/2" Key
5	672-345	1/2" Shear Bolt
6	552-023	1/2" Lock Nut
7	104-12	Magnetic Sensor Mounting Bracket
8	765-202	Magnetic Sensor (for Jemm controller)
9	765-204	Sensor Sprocket
10	765-207	Vibration Isolator Bolts (set of 4)
11	694-100	Sensor Switch Cover Box
12	765-201	JEMM Speed Sensor Switch (Governor)
13	765-206	JEMM Wiring Cable & Plug
14	765-200K	Complete JEMM Governor Kit

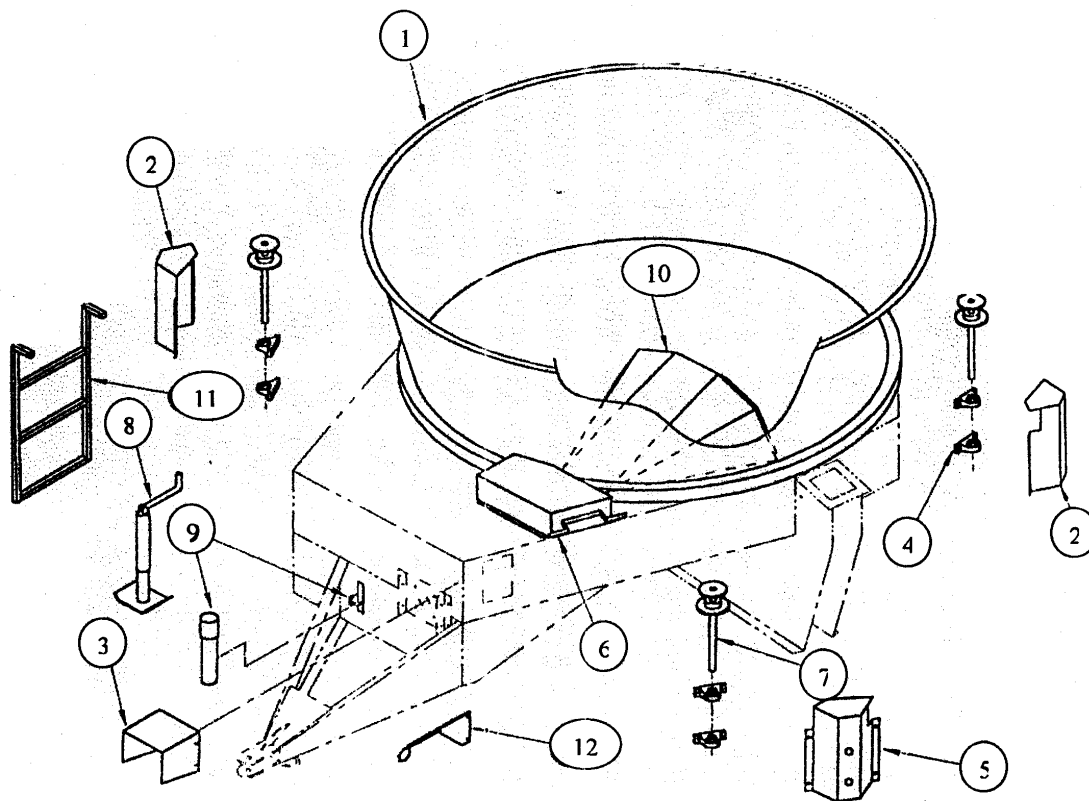
HYDRAULICS CONTROLS



HYDRAULIC ASSEMBLY

KEY	PART #	DESCRIPTION
2	356-084	Hyd. Hose, ½" x 96"
3	356-082	Hyd. Hose, ½" x 30"
4	276-127	90 Degree Coupling Union
5	738-038	Tightener Spring
6	126-127	QD, Hub
7	540-034	Hydraulic Motor
8	544-025	Hyd Motor Mount Assembly
9	183-001	Solenoid Valve Coil
10	826-034	Solenoid Valve
11	826-033	Flow Divider
13	826-035	Check Valve
14	740-269	80 Series Drive Sprocket
15	356-081	Hyd. Hose, ½" x 16"
16	356-083	Hyd. Hose, ½" x 36"
17	790-013	Tightener Bolt
18	210-075	Cover Plate

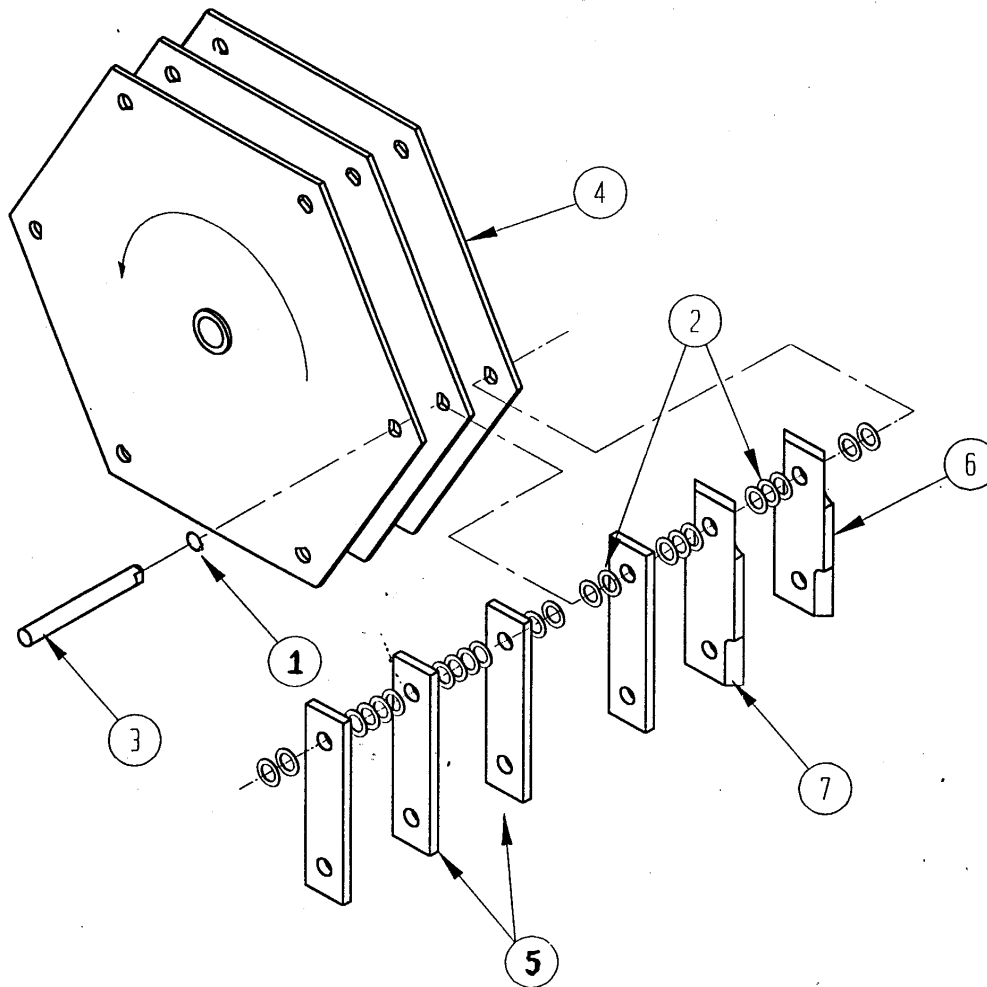
TUB AND SHIELDS



TUB AND SHIELDS

KEY	PART #	DESCRIPTION
1	815-001	Tall Tub Weldment (51" deep)
Optional	815-04	Short Tub Weldment (36" deep)
2	694-363	Tub Roller Shield (R.F. & L.R.)
3	694-380	PTO Shield
4	072-458	1-3/16" Pillow Block Bearing (tub roller)
5	694-364	Tub Roller Shield (L.F. & R.R.)
6	694-361	Hydraulic Motor Shield
7	682-654	Tub Roller Weldment
	184-042	Lock Collar (used on both rear tub rollers)
8	748-011	Hitch Jack
9	350-05	Literature Canister
	104-08	Canister Attachment Bracket Only
10	348-021	Stabilizer Hood
11	389-01	Ladder
12	150-008	Hose Carrier

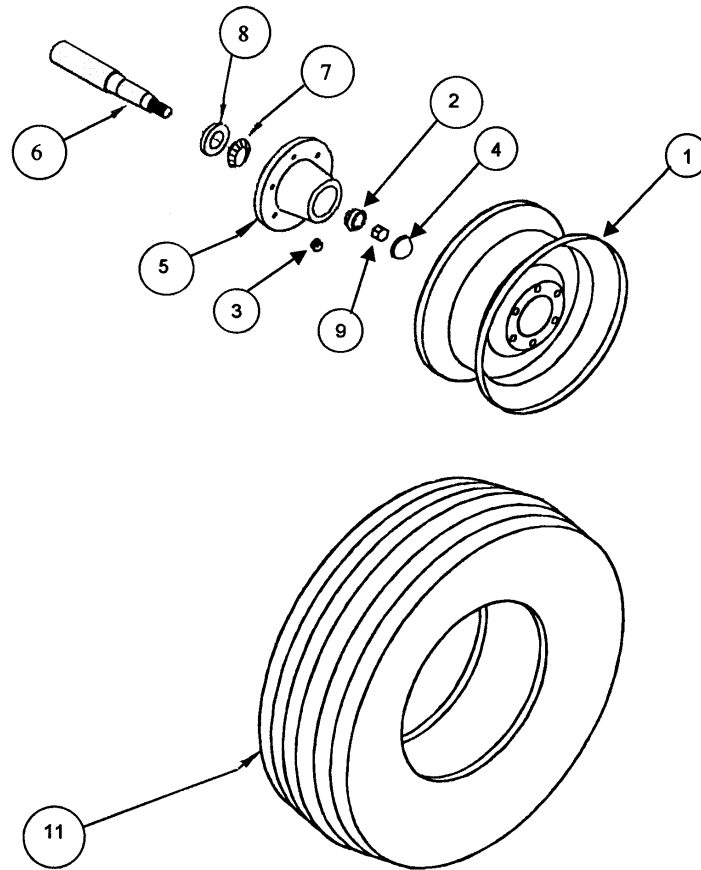
ROTOR ASSEMBLY



MODEL 1090 ROTOR ASSEMBLY

KEY	PART #	DESCRIPTION
1	642-055	Snap Ring for Hammer pin
2	724-214	Thick Hammer Spacer (10 gauge)
	126-058	Thin Hammer Spacer (14 gauge)
3	580-05	Hammer Pin 1090
4	656-01	10" Rotor Weldment
5 Optional	328-001	Standard Hammer (Case Hardened – Grain Machine)
Optional	328-001H	Standard Hammer (Hard Faced & Case Hardened)
Standard	328-001HS	Standard Hammer (Hard Faced Only)
6	328-008H	1090 Lead Hammer (Beveled Hard Faced & Case Hardened)
7	328-003H	Lead Hammer (Beveled Hard Faced & Case Hardened)
Optional	328-009	Alfalfa Hammer
Optional	580-202	Hammer Tie Pin
Optional	404-932	Collar for Tie Pins

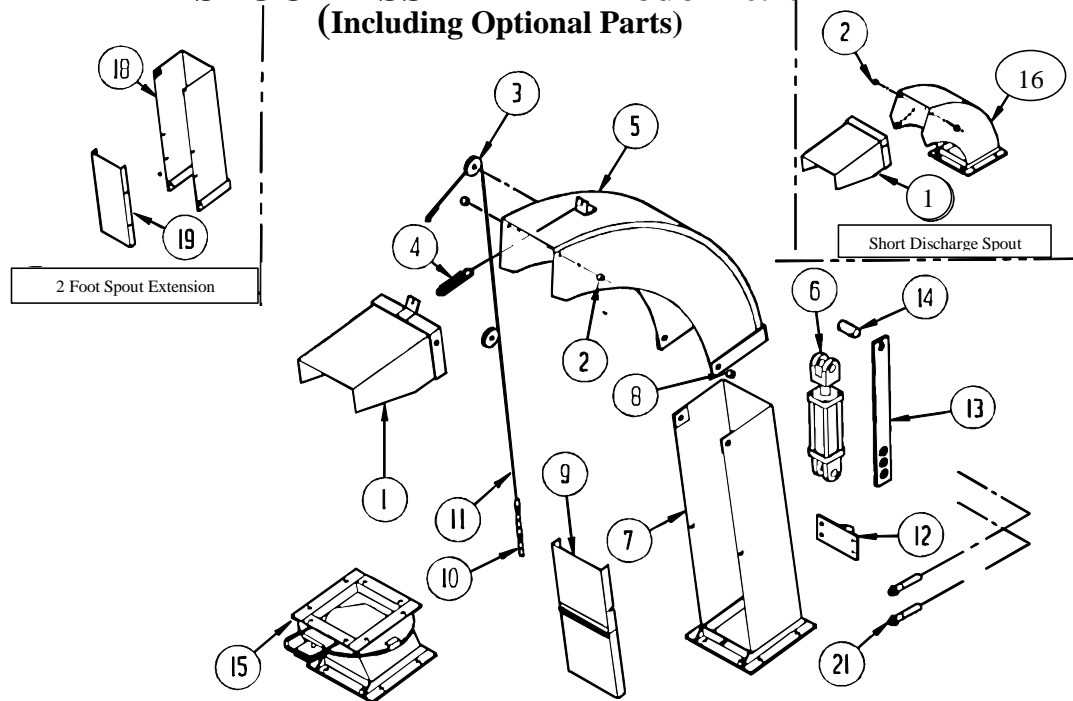
WHEEL AND HUB ASSEMBLY



WHEEL and HUB ASSEMBLY

KEY	PART #	DESCRIPTION
1	640-03	Wheel Rim (15"x 8" 6 hole)
2	910-259	Tapered Outer Bearing
3	552-06	Lug Nut (1/2"x 20 UNF)
4	909-905	Hub / Dust Cap
5	280-551	6 Bolt Hub (with bearing races inside)
6	726-01	Spindle
7	910-264	Tapered Inner Bearing
8	906-284	Dust / Grease Seal
9	552-030	Castle Nut (7/8"x 14 UNF)
11	800-021	Tire Radial (265/75R15)

SPOUT ASSEMBLY Model 1090 (Including Optional Parts)



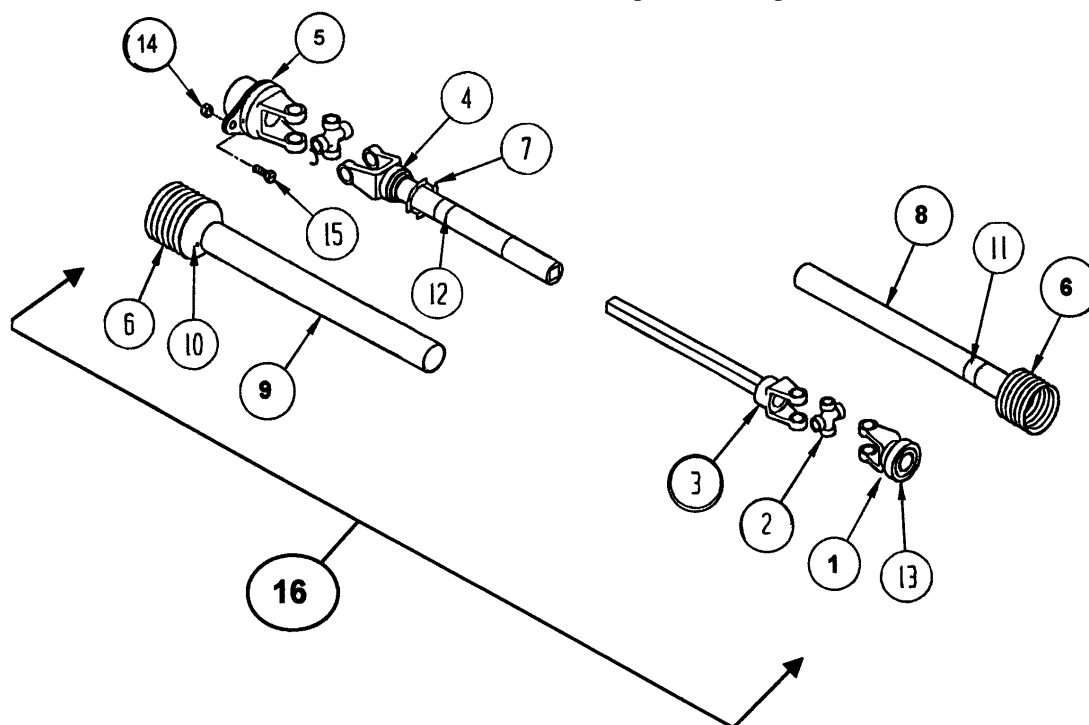
Model 1090 SPOUT PARTS & ASSEMBLIES

KEY	PART #	DESCRIPTION
1	348-17	Deflector Hood (10" Flipper)
2	126-121	Pivot Bushing
3	706-01	Pulley
4	738-01	Return Spring
5	348-18	Upper Curved Spout Section (1090)
6 Optional	222-02	2"x 4" Stroke Hyd Cylinder
7	734-30	Lower Spout Half 10"x 10"
7	734-20	Lower Spout Half 7"x 10"
8	126-121	Pivot Bushing
9	210-05	Spout Shield
Optional	210-07	Extended Spout Shield 10"
10	136-01	1/4"x 12" Adjusting Chain
11	103-01	1/8"x 60" Adjustment Cable
12	222-03	Cylinder Ear
13	036-04	Cylinder Strap
14	580-01	Cylinder Strap Pin
15	734-100	Spout Swivel (1090 – 7"x 10" to 10"x 10")
16 Optional	734-16	Shout Discharge Spout (10")
Optional	734-16H	Short Discharge Spout with Cylinder Ears (10")
18 Optional	257-04	2 Foot Spout Extension (10"x 10")
18	257-03	2 Foot Spout Extension (7" x10")
19 Optional	212-081	2 Foot Spout Extension Cover Shield (10")
20 Optional	130-02	1/8"x 24" Cable Extension
21 Optional	356-080	1/4"x 16' Hydraulic Hose

PTO DRIVE LINE ASSEMBLY

SHEAR BOLT YOKE

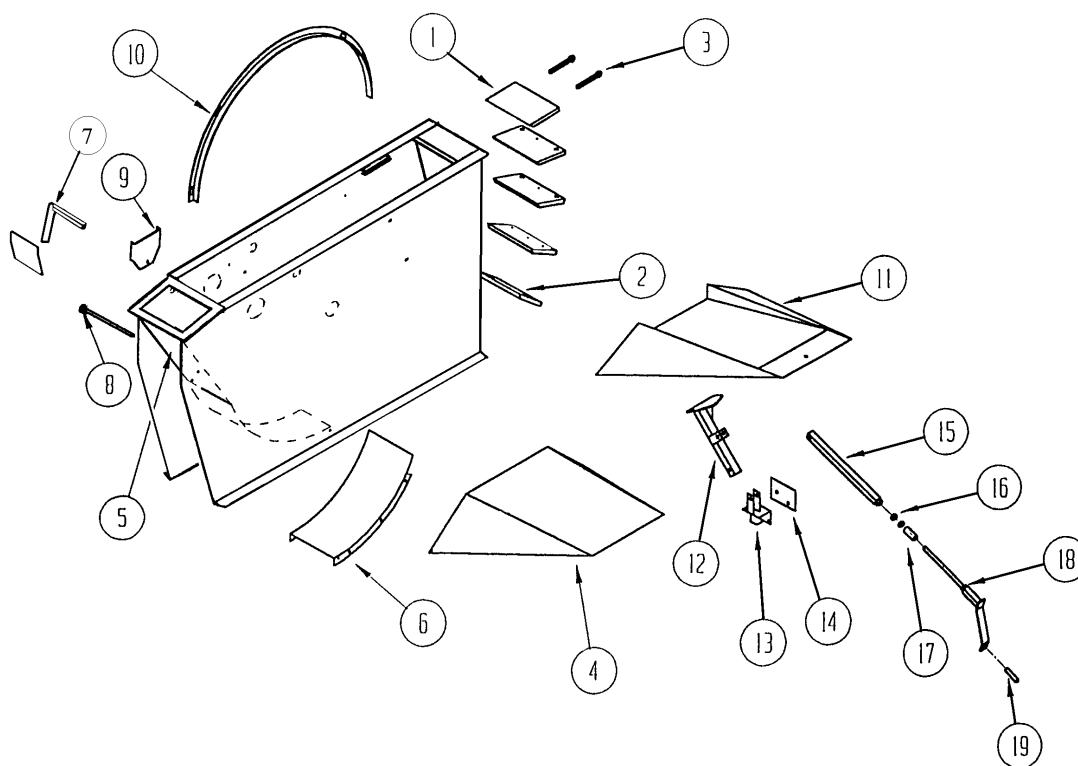
Walterscheid brand from Sept. 1987 on up



PTO PARTS BREAKDOWN

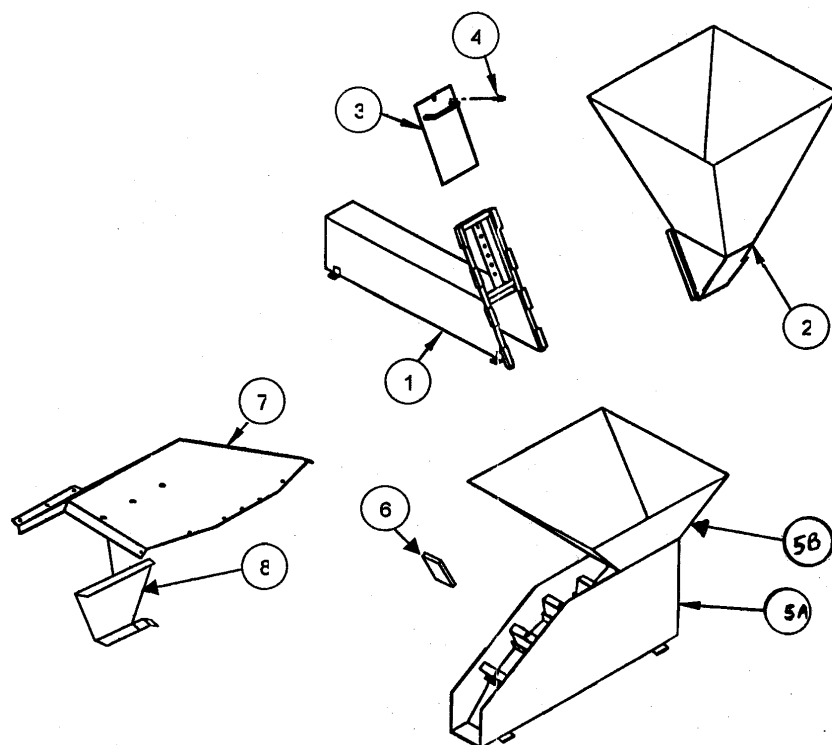
KEY	PART #	DESCRIPTION
1	362430	Tractor Slide Yoke, (1-3/8" – 21 splined)
	362428	Tractor Slide Yoke, (1-3/8" – 6 splined)
	362434	Tractor Slide Yoke, (1-3/4" – 20 splined)
2	312209	Cross Bearing Repair Kit
3	391294	Yoke & Bar Weldment, Inboard
4	391295	Yoke & Sleeve Weldment, Outboard
5	391809	Shear Bolt Clutch
6	365387	7 Rib Cone Shield
7	87276	SC25/I Bearing Ring
8	391434	Outer Tube Shield
9	391433	Inner Tube Shield
10	365305	Lock Screw
11	383333	Outer Shield Decal
12	383334	Inner Shield Decal
13	364915	Slide Collar Repair Kit
14	10490	Shear Bolt Lock Nut (M12)
15	20466	Shear Bolt (M12 x 60 – 8.8)
16	391296	Complete W2500 Series PTO (1-3/8" – 21)
17	396953	Complete Implement Half (1-15/16 shear yoke)
18	391292	Complete Tractor Half (1-3/8" – 21)
	395730 Optional	Complete Tractor Half (1-3/4" 20 over size)
	391780 Optional	Complete Tractor Half (1-3/8" 6 splined)

MILL HOUSING PARTS and ACCESSORIES



KEY	PART#	DESCRIPTION
1	590-05	Main Shear Plate 10" (no acme Bolt)
2	590-07	Standard Shear Plate 10"
3	096-121	Adjusting Bolt for Main Shear Plate
4 Outdated	348-015	Low Riser (6" High)
4 Outdated	348-016	High Riser (8" High)
4 Outdated	348-017	Medium Riser (7" High)
5	234-05	Lower Discharge Door 10"
6	234-06	Replaceable Bottom Section 10"
6 Optional	234-06-SP	Replaceable Bottom Section 10" (with extra shear spot)
7 Optional	234-009	Adjustable Air Control Plate
7 Optional	036-214	Adjustable Air Control Arm Weldment
8	580-06	Lower Door Pin
9	223-004	Air Damper Door
10	322-006	Twine Guard
11	348-040	1090 Adjustable Riser
12	036-05	Support Arm
13	104-11	Mounting Bracket
14	590-04	Backing Plate
15	036-06	Adjusting Arm
16	360-03	Set Collar
17	724-03	Adjustable Riser Handle Bushing
18	320-03	Adjusting Handle
19	400-308	Handle Grip

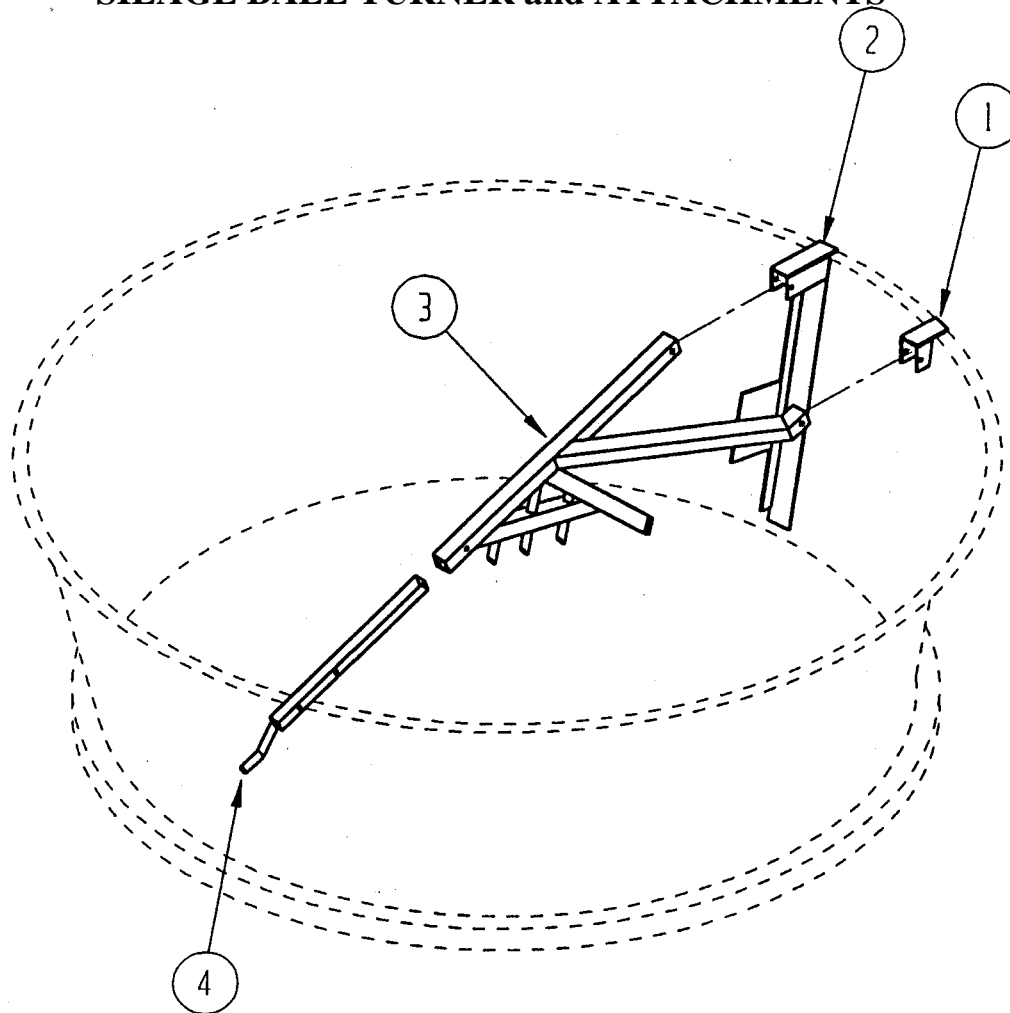
OPTIONAL ATTACHMENTS



CORN and GRAIN ATTACHMENTS

KEY	PART #	DESCRIPTION
1	348-09	Shell Corn Hood 1090
2	348-28	Shell Corn Fill Chute 1090
3	234-27	Adjusting Gate 1090
4	580-02	Adjusting Gate Pin
5	348-020	Grain Hood Assembly 1090
5A	348-19	Grain Hood (lower half only)
5B	348-14	Grain Hood Hopper
6	590-07	Shear Plate Weldment
7	215-260	Ear Corn Shield
8	215-240	Support Clip for Ear Corn Shield

SILAGE BALE TURNER and ATTACHMENTS



KEY	PART #	DESCRIPTION
1	104-05	Short Pivot Bracket
2	104-04	Long Pivot Bracket
3	036-02	Silage Bale Turner Arm
4	036-03	Silage Arm Extension
5	014-001	Big Round Bale Assist

DELIVERY SERVICE FOR ROTO GRIND

This form must be filled out by the dealer and signed by both the dealer and the customer at the time of delivery

Delivered to: _____
 Address: _____
 City _____ Ph# _____
 State _____ Zip _____

Dealer _____
 Ph# _____ City _____
 State _____ Zip _____
 Serial # _____
 Model # _____

I have thoroughly instructed the buyer on the above-described equipment, which review the Operator's Manual Content, Equipment Care, Adjustments, and safe operation. The Warranty policy provisions were also explained and reviewed.

DEALERS SIGNATURE _____

Above equipment and Operator's Manual have been received by me and I have been thoroughly instructed as to care, adjustment, safe operation and applicable warranty policy.

DATE _____ OWNERS SIGNATURE _____

DEALER COPY

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MANUFACTURER COPY

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Dealer _____
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CUSTOMER COPY