1985 -1989

# OPERATOR AND PARTS MANUAL FOR TUB GRINDER



BURROWS ENTERPRISES, INC. 6340 West 10th Street 2024, E. Sta Street Greeley, Colorado 80634 80631 970 (303) 353-3769

#### 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 after the date of delivery to the first purchaser subject to the following conditions:

1. Burrows Enterprises Incorporated's 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's warranty does not extend to 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 MERCHANTIBILITY OR FITNESS FOR ANY PARTICULAR PURPOSE BEYOND THAT EXPRESSLY STATED IN THIS WARRANTY. Burrows Enterprises Incorporated's 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 parts 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 this warranty.

7. No dealer, employee or representative is authorized to change this 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 or exclusions 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**

OWNER'S NAME		
ADDRESS		
DEALER'S NAME		
ADDRESS		
SERIAL NUMBER	(FOR LOCATION SEE PAGE 6)	
DATE PURCHASED .	(FOR LOCATION SEE FAGE 6)	

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, accept no responsibility for variations which may be evident in the actual specifications of its products and the statements and descriptions contained in this publication.

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A Careful Operator

IS THE BEST INSURANCE

AGAINST AN ACCIDENT

-National Safety Council.

### 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 through the years of building and testing this equipment. The way you operate and the care you give this unit will have much to do with the successful performance of this unit. This operators 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. Keep this manual handy for reference. We will be glad to answer any questions you may have. For further information call or write

#### BURROWS ENTERPRISES INCORPORATED 6340 West 10th Street D Greeley, CO 80634 Phone: (303) 353-3769

## 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 INSUR-ANCE AGAINST AN ACCIDENT.

#### **BEFORE OPERATING**

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 pocket.

After servicing, be sure all tools, parts, or servicing equipment are removed from the machine.

Keep all safety shields in place.

Make sure the 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 the tractor and put key in pocket.

Always disengage the P.T.O. before transporting. Do not open any covers and expose the rotor or belts while they are rotating.

Shut off the tractor engine and be sure to wait until all moving parts have come to a complete stop before adjusting, cleaning, or lubricating. Keep hands, feet, clothing and objects away from moving parts. Use extreme care when transporting over uneven or rough terrain.

Keep all shields in place and in good condition. Keep children away from machine in operation. Have your fire extinguisher checked at regular internals 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 over heating. 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 regulations 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.

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### 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 the 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. Warrantee 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 1150 R.P.M. or serious damage could result to the machine.

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 plug 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 are small enough to fit into 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.

#### SAFETY DECALS

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



NO. 1 - "WARNING" - NOT A STEP Part No. E224-114



NO. 2 - "CAUTION" - DO NOT OPERATE MILL ABOVE 1150 RPM - Part No. E224-113



NO. 4 - "WARNING" - KEEP SHIELD IN PLACE AND HANDS CLEAR OF MILL -Part No. E224-117



- NO. 3 "CAUTION" KEEP ALL SHIELDS IN PLACE; STOP ENGINE BEFORE LEAVING OPERATOR'S POSITION -PART NO. 19998-0 LISTS 8 BASIC RULES TO BE OBSERVED AT ALL TIMES.
- NO. 5 "SLOW MOVING VEHICLE" -BRACKET FOR SMV SIGN IS PERMANENTLY AFFIXED TO REAR FRAME. DISPLAY SIGN AS REQUIRED BY LAW.
- NOTE: KEEP ALL DECALS CLEAN AND FREE OF DIRT FOR MAXIMUM VISIBILITY. REPLACE ANY AND ALL DECALS THAT ARE NO LONGER LEGIBLE.



Stay off machine when it is running. Shut off tractor engine and remove ignition key for safety while working in or around machine.

NO. 6 - "DANGER" - STAY OFF MACHINE WHEN IT IS RUNNING - PART NO. 11777-0.



NO. 7 - "CAUTION" - READ THE OPERATOR'S MANUAL - PART NO. 11543-0.

#### 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.

Delivery service form in the front of the book 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 in operation.

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WHEN CORRESPONDING WITH THE COMPANY, DISTRIBUTOR, OR DEALER REGARDING THIS MACHINE, PLEASE SPECIFY BOTH MODEL NUMBER AND SERIAL NUMBER.

1. Shear plates (Items 1 & 2, Page 13) 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 plates 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 make the unit pull easier with less shock loads.

2. FEED CONTROL RISERS. There are two heights of risers (Items 7 & 8, Page 13) that control the amount of "bite" the hammers take out of the material every time the tub is rotated. The high riser is (Item 8, Page 13) is designed for round bales, square bales, extremely wet, loose material or limited horse power. The medium riser (Item 7, Page 13) is designed for coarse, loose material that is reasonably dry and for larger horse power tractors where high capacity is desired.

• 3. HYDRAULICS. Tractor hydraulics are used to turn the tub. There is a dial (Item 12, Page 11) mounted on the left front of the machine that is a pressure compensated flow divider to control the rotation speed of the tub. This is to be used in conjunction with height of risers to match the grinding speed to the tractor horse power. 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 must be turned very slowly, check the hydraulics periodically for heat. (Temperature should be kept below 150 degrees F.)

There is an electronic governor (Item 2, Page 11) and solenoid valve (Item 11, Page 11) in the hydraulic circuit to stop the tub rotation if the tractor RPM drops - this governor works in the "clockwise rotation" of the tub "only". The tub can not be rotated in the proper clockwise rotation unless the governor is connected to a 12 volt electrical circuit and the RPM of the PTO reaches 1,000 to 1,050 RPM. (This is adjustable by loosening the hold down bolt in the case of the governor and rotating the outer case.) We recommend that the governor be set to stop the tub when the speed of the PTO slows down to 1000 RPM. If the govenor speed is set too low, the lead hammer will rock back excessively causing wear on the hammer pin and hammer hole. 4. POWER TAKE OFF. The drive line is at a slight angle to the machine. Before starting the grinder, move the front of the tractor to the right to straighten PTO. If it is not straight at the tractor joint it will cause vibration and serious damage to the PTO could result.

+ 1

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 R.P.M. and <u>slowly</u> engage the P.T.O. clutch. If the mill is still "locked", disengage P.T.O., shut off the tractor, remove key and place in pocket, or in absence of key, (older model tractors), disconnect the P.T.O. shaft from the tractor. Now step inside of tub and clean out 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 high RPM the weight of the rotor may damage the PTO in your tractor.

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

5. DISCHARGE CONTROL (Item 10, Page 13). The ROTO GRIND is equipped with a discharge control to limit the volume of air discharged with the ground material. You may want the air flow limited when grinding dry material in a stock pile outside, however for wet material or grinding into self-feeders or storage buildings you will probably want the discharge control"open" to move the material farther. Select the setting for your situation.

6. DISCHARGE SPOUT (Item 12, Page 13). The discharge spout can be mounted to discharge ground material to the side of the machine or to the back of the machine. The standard spout will have **%'** clearance to the ground and will allow you to build a pile about 11' high. There are 2' spout extensions (Item 13, Page 13) available and a maxium of two can be added to the standard spout. Longer spout requires fairly dry material and may plug if hay is too wet.

7. EAR CORN HOOD (Item 17, Page 12). This attachment is designed for ear corn to be loaded with a front end loader. It shields the mill to stop the material from being thrown out of the tub. If the grind is too fine when the hood is installed, move the bottom adjustable shear plates in the mill out. 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 you should keep the material under two feet deep in the tub. Overloading will cause excessive hydraulic pressure and tend to heat the hydraulic oil.

8. GRAIN HOOD (Item 6, Page 12). The grain hood is designed for loading with an auger. Remove the feed control riser and the round stabilizer hood and bolt the grain hood in place. This hood is equipped with extra adjustable gate to control the amount of grain entering the grinding area. Adjust this gate to the horse power of the tractor. "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 with the grain hood installed.

### MAINTENANCE

BOLT AND NUT TORQUE SPECIFICATIONS

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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 in operation.

: 12×0.	Grade 2	Grade 5
BOLT	NO RADIAL DASHED	THREE RADIAL DASHES
1/4	6	9
5/16	11	18
3/8	19	31
7/16	30	50
1/2	45	75
9/16	66	110
5/8	93	150
3/4	150	250
7/8	202	378
1	300	583

1. LUBRICATION. The three bearings on the drive line 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 to enter the bearing shortening the bearing life. The tub roller bearings should be greased once a season or every one hundred hours, whichever occurs first.

a) Check the bearings on the drive line every time the unit is greased. If one of these bearings go out and the machine is operated, it may cause the drive line to break, causing serious damage to the machine.

2. HAMMER REPLACEMENT. The hammer pins have a flattened area on one end and "D" inthe mill. When turning the hammers, remove snap ring from the "D" end. Drive the pin out of the mill through the holes provided in the mill housing. When the hammers have been turned, replace the pin and snap ring.

3. If for any reason the mill ever needs to be removed, it is attached to the drive line by a "shear bolt. Remove the shear bolt and apply rust remover. Loosen the lock collar on the back bearing and unbolt the front two bearings. Lock the drive line with the PTO, apply the forward pressure on the drive line and turn the mill on the shaft. It is a slip fit and should come off without too much difficulty.

4. 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. Mis-alignment will cause excessive wear on the sprocket and chain.





HYDRAULICS

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GOV	ERNO	R (PAGE	11)
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KEY	PART NO.
1 2	E706-076 E764-002
3 5 6 7 8 9 10 11 12 13	E104-383 E276-127 E276-136 E104-384 E540-033 E544-025 E790-013 E738-038 E826-034 E183-001 E826-033 E834-021
14	E826-035 E740-268
15 16	E356-081 E356-082

KEY

PART NO.

#### DESCRIPTION

PULLEY, GOVERNOR GOVERNOR

BRACKET, GOVERNOR MOUNT UNION, 90° COUPLING UNION, STRAIGHT COUPLING BRACKET, MOTOR MOUNT MOTOR, HYDRAULIC MOTOR MOUNT ASSEMBLY BOLT, TIGHTENER SPRING, TIGHTENER VALVE, SOLENOID COIL, SOLENOID VALVE FLOW DIVIDER WIRE, GOVERNOR VALVE, CHECK SPROCKET, TUB DRIVE HOSE, 1/2 × 16" HOSE, 1/2 × 30"

### SHEAR PLATES & ACCESSORIES (PAGE 13)

DESCRIPTION

INC I			DESCRIPTION
1	E590-155 E590-071 E096-121		STANDARD SHEAR PLATE - BOLT ON TYPE STANDARD SHEAR PLATE - OLD STYLE WITH ACME. BOLT, SHEAR PLATE
	E552-108		NUT ASSEMBLY
2	E590-092		MAIN SHEAR PLATE ASSY.
	E590-072		MAIN SHEAR PLATE
	E096-121		BOLT, SHEAR PLATE
	E552-108		NUT ASSEMBLY
3	E096-121		BOLT, SHEAR PLATE
4	E234-003	· .	DOOR WELDMENT
5	E234-007		DOOR, ADJUSTMENT DISCHARGE = ON OLDER UNITS
6	E348-015		DOOR, ADJUSTMENT DISCHARGE = ON OLDER UNITS LOW RISER - 6" HIGH ONLY.
7	E348-017		MEDIUM RISER - 7" HIGH
8	E348-016		HIGH RISER - 8" HIGH
4 5 7 8 9	E036-156		ARM WELDMENT
10	E234-006		DOOR, DAMPER
11	E210-076		COVER, CHUTE
12	E734-002		DISCHARGE SPOUT, COMPLETE
13	E257-019		DISCHARGE EXTENSION ASSY, 2 FT.
14	E348-013		DEFLECTOR, SPOUT
15	E348-018		STATIONARY HOOD (NOT SHOWN)
16	E330-009		HANDLE
17	E312-017		EAR CORN HOOD (NOT SHOWN)
18	E014-004		BIG ROUND BALE ASSIST (NOT SHOWN)
19	E230-002		DIFFUSER (NOT SHOWN)
20	E322-003		TWINE GUARD (NOT SHOWN)
20			



TUB & SHIELDS



KEY	PART NO.	QTY REO	DESCRIPTION	
1 2	E590-155 E694-363 E694-364		PLATE, STD. SHEAR SHIELD, ROLLER (RIGHT FRONT & LEFT REAR) SHIELD, ROLLER (LEFT FRONT & RIGHT REAR)	
3 4 5 6 7	E694-361 E694-380		SHIELD, HYDRAULIC MOTOR	
5	E604-039		SHIELD, PTO PTO 55NW (SEE BREAKDOWN)	
6	E748-011		JACK, HITCH (COMPLETE)	
7	E815-002		TUB ASSEMBLY	
8	E682-654 E184-042		ROLLER ASSY COLLAR, LOCK	
9	E072-458		BEARING, 1-3/16 PILLOW BLOCK	
10	R64433		HUB, 5 BOLT W/CUPS	
	01263-0		CONE, OUTER BEARING	
	04437-0		CONE, INNER BEARING	
	03542-0		CAP, HUB	
	12983-0		NUT, 7/8-14 HEX SLOTTED	
	R64435		SEAL, OIL	
11	E728-025		SPINDLE, WHEEL	
	02073-0		NUT, 1/2-20 LUG	
; 12 13	01268-0 17653-02	1	RIM, 15 × 6 CHAIN, SAFETY	
1.1.5	1/055-02		UNALIN, SALLII	





### SEE PARTS LIST ON PAGE 16

### DRIVE SHAFT (PAGE 15)

KEY	PART NO.
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	R38710 E724-249 E724-248 E072-358 02252-0 E552-035 02043-0 E682-724 E672-416 E388-028 99087-0 E080-048 02044-0 E590-117 E706-078 02045-0 E552-044 E072-445 02311-0 99061-0
20	

#### DESCRIPTION

NUT, 5/8-18 HEX SPACER, .060 SPACER, .105 BEARING, 2.00 PILLOW BLOCK SCREW, 3/8-16 x 1 SET NUT, 3/8 HEX JAM WASHER, 5/8 FLAT DRIVE SHAFT BOLT, 5/8-18 x 2-1/2 HEX KEY, 3/8 SQ. x 2-1/2 BOLT, 3/8 x 3-1/2 HEX BELT, A35 WASHER, 5/8 LOCK PLATE, BEARING MOUNTING SHEAVE, A-1 NUT, 3/8 HEX NUT, 3/8 LOCK BEARING, 2.00 FLANGE BLOCK BOLT, 5/8 x 2-1/2 HEX BOLT, 5/8 x 1-1/2 HEX

### ROTOR

ASSEMBLY (PAGE 17)

KEY	PART NO.	DESCRIPTION
1 2 3 4 5 6 7 8	E126-058 E126-192 E328-00 E642-055 E580-207 E656-068 E656-059 03856-0 12789-0	BUSHING, 14 GA. MACHINE BUSHING, 10 GA. MACHINE HAMMER, STANDARD HAMMER, BEVELED SNAP RING PIN, HAMMER ROTOR WELDMENT ROTOR ASSEMBLY (COMPLETE) BOLT, 5/8"X 4 GR 5 HEX NUT, 5/8" HEX LOCK



P.T.O. (WEASLER 55NW) 1000 R.P.M.



KEY	PART NO.
1	E604-039
2	19948-0
3	E830-157
4	E635-004
5	E830-158
6	E642-035
7	E072-381
8	E694-383
9	E126-116
10	19949-0
11	E694-382
12	E072-381
13	E830-179
14	02576-0
15	E830-178
16	02567-0
17	E
18	19955-0
9	19955-0
20	E830-156
21	E390-247

#### DESCRIPTION

P.T.O., COMPLETE 48.25 OACL IMPLEMENT HALF YOKE, END KIT, CROSS & BEARING YOKE & TUBE RETAINER, BEARING BEARING, NYLON SHIELD, INNER CENTRALIZER, NYLON TRACTOR HALF SHIELD, OUTER BEARING, NYLON SHAFT W/SHEAR FLANGE BOLT, 5/16 x 1-1/2 GR 5 YOKE, SHEAR W/ILK NUT, 5/16 HEX LOCK KIT, INSTAMATIC LUBE WASHER RING, RETAINING LOCK YOKE ASSY KIT, LOCK REPAIR