

MAN 4158496
Rev. A 3-2007

MODELS:
73-70900
CHIPPER SHREDDER CS312
75-70902
CHIPPER SHREDDER BLOWER ATTACHMENT CS3130



OP/PARTS MANUAL

**CALIFORNIA
Proposition 65 Warning**

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects and other reproductive harm.

 **WARNING**

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

**Californie Proposition 65
Avertissement**

Les échappements des moteurs diesel et certains de leurs composés sont reconnus par l'Etat de Californie pour être cancérigènes, provoquer des défauts congénitaux et d'autres dangers en matière de reproduction.

 **AVERTISSEMENT**

L'émission du moteur de ce matériel contient des produits chimiques que l'Etat de Californie considère être cancérigènes, provoquer des défauts congénitaux et d'autres dangers en matière de reproduction.

**California Advertencia
de la Proposicion 65**

El estado de California hace saber que los gases de escape de los motores diesel y algunos de sus componentes producen cáncer, defectos de nacimiento y otros daños en el proceso de reproducción humana.

 **ADVERTENCIA**

El estado de California hace saber que los gases de escape de este producto contienen productos químicos que producen cáncer, defectos de nacimiento y otros daños en el proceso de reproducción humana.

**CALIFORNIA
Proposition 65 Warning**

Battery posts, terminals, wiring insulation, and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.
WASH HANDS AFTER HANDLING.

CHIPPER/ SHREDDER

IMPORTANT MESSAGE

Thank you for purchasing this Schiller Grounds Care, Inc. product. You have purchased a world class product, one of the best designed and built anywhere.

This product comes with an Owner/Operator's Manual. The useful life and good service you receive from this product depends to a large extent on how well you read and understand this manual. Treat this product properly and adjust it as instructed, and it will give you many years of reliable service.

See a Schiller Grounds Care, Inc. dealer for any service or parts needed. Schiller Grounds Care, Inc. service ensures that you continue to receive the best results possible from Schiller Grounds Care, Inc. products. You can trust Schiller Grounds Care, Inc. replacement parts because they are manufactured with the same high precision and quality as the original parts.

Schiller Grounds Care, Inc. designs and builds its equipment to serve many years in a safe and productive manner. For longest life, use this product only as directed in the manual, keep it in good repair and follow safety warnings and instructions. You'll always be glad you did.

Schiller Grounds Care, Inc.
One Bob Cat Lane
Johnson Creek, WI 53038-0469

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DESCRIPTION

CHIPPER/ SHREDDER

DESCRIPTION

This Chipper/Shredder is designed to grind, shred, and chip a variety of materials into a useable processed material to enrich, beautify and landscape. Mounted on the front of the Steiner 4-wheel drive articulated frame tractor enables the chipper/shredder to be used in a variety of locations.

Small materials such as leaves, yard and garden debris (cornstalks, plants, prunings, vines, etc.) can easily be processed through the shredder inlet. Sticks and branches should be limited to 1-1/2 inches in diameter and no longer than 24 inches to avoid excess whipping and wrapping. The processed material can be placed in a compost pile or spread on the ground as mulch, giving a professionally landscaped look.

The chipper inlet can chip branches up to 4 inches in diameter. Several small branches can be grouped and fed into the chute together. The chipper can reduce a pile of branches and brush into useful and attractive decorative landscape chips.



CHIPPER/ SHREDDER

SPECIFICATIONS

SPECIFICATIONS

Overall Width.....	35-5/8"
Overall Height.....	44-1/2"
Overall Length.....	53-1/4"
Chipper Knives.....	4 Hardened
Shredder Sections.....	72 Hardened
Rotor Diameter.....	18"
Rotor Width.....	12"
Rotor Speed (maximum).....	1550 RPM
Shredder Throat Opening.....	9-1/2" X 11"
Maximum material size for Shredder.....	1-1/2" diameter X 24" long
Maximum material size for Chipper.....	4" diameter
Application.....	Steiner 420, 425 & 525 Power Units Only.
Weight.....	430 lbs.

Specifications are subject to change without notice.



NOTICE !!!

Unauthorized modifications may present **extreme** safety hazards to operators and bystanders and could also result in product damage.

Schiller Grounds Care, Inc. strongly warns against, rejects and disclaims any modifications, add-on accessories or product alterations that are not designed, developed, tested and approved by Schiller Grounds Care, Inc. Engineering Department. Any Schiller Grounds Care, Inc. product that is altered, modified or changed in any manner not specifically authorized after original manufacture—including the addition of “after-market” accessories or component parts not specifically approved by Schiller Grounds Care, Inc.—will result in the Schiller Grounds Care, Inc. Warranty being voided.

Any and all liability for personal injury and/or property damage caused by any unauthorized modifications, add-on accessories or products not approved by Schiller Grounds Care, Inc. will be considered the responsibility of the individual(s) or company designing and/or making such changes. Schiller Grounds Care, Inc. will vigorously pursue full indemnification and costs from any party responsible for such unauthorized post-manufacture modifications and/or accessories should personal injury and/or property damage result.



This symbol means:
ATTENTION!
BECOME ALERT!

Your safety and the safety of others is involved.

Signal word definitions:

The signal words below are used to identify levels of hazard seriousness. These words appear in this manual and on the safety labels attached to Schiller Grounds Care, Inc. machines. For your safety and the safety of others, read and follow the information given with these signal words and/or the symbol shown above.

DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, **WILL** result in death or serious injury.

WARNING

WARNING indicates a hazardous situation which, if not avoided, **COULD** result in death or serious injury.

CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **COULD** result in minor or moderate injury. It may also be used to alert against unsafe practices or property damage.

CAUTION

CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, **MAY** result in property damage.

Schiller Grounds Care, Inc.

One Bobcat Lane
Johnson Creek, WI 53038 U.S.A
Phone: 920-699-2000
Fax: 920-699-3683

MODEL NUMBER

SERIAL NUMBER

MODEL NUMBER: This number appears on sales literature, technical manuals and price lists.

SERIAL NUMBER: This number appears only on your mower. It contains the model number followed consecutively by the serial number. Use this number when ordering parts or seeking warranty information.

GENERAL SAFETY

1. Read and understand the Owner's Manual before attempting to operate this machine.
2. Operate all controls from the operator's seat. **NO RIDERS.**
3. Keep all shields in place and safety switches adjusted properly.
4. Do not leave equipment unattended. STOP the engine and remove the key.
5. Do not allow minors or the inexperienced to operate this machine.
6. Keep people and pets a safe distance away from machine using power driven attachments. Injury could result from flying debris.

OPERATING SAFETY

1. **STOP ENGINE** to install drive belt.
2. **DO NOT** attempt to work on unit or any attachments with the engine running. **STOP ENGINE!**
3. Before leaving the operator's seat:
 - **Disengage PTO drive.**
 - **Set Parking brake.**
 - **Stop Engine.**

CAUTION

ALWAYS WEAR SAFETY GLASSES WHEN OPERATING CHIPPER/SHREDDER.

DANGER

DO NOT OPERATE WITH PERSONS IN THE AREA. CHIPPER/SHREDDER MAY PROPEL OBJECTS CAUSING POSSIBLE INJURY OR DEATH.

SAFETY OPERATING INSTRUCTIONS



1. Wear safety glasses at all times while operating the machine.
2. The operator should also wear heavy boots, gloves and other adequate clothing to protect himself from branches and other sharp or harmful objects. Avoid wearing loose-fitting clothing.
3. Keep proper balance and footing at all times. Do not overreach.
4. Keep face and body away from the feed opening. Do not allow hands, feet, or clothing inside the feeding chamber or discharge chute.
5. Move machine to a clear level area outdoors before starting. Do not operate machine on a paved, concrete or hard gravel surface. Discharged material may rebound.
6. Emergency stop switch must have cable plugged into outlet on power unit. Do not operate machine without this emergency stop switch connected.
7. When feeding shreddable material into the machine, be extremely careful that pieces of metal, rocks, bottles, cans or other foreign objects are not fed into the feeding chamber.
8. If the machine becomes clogged, disengage PTO, stop engine and allow machine to come to a complete stop before clearing debris.
9. The chipper/shredder rotor may continue to rotate even with the engine stopped. Do not attempt any repairs or adjustments until the entire machine has come to a complete stop. Never operate this machine without the discharge screen in place.

MOUNTING INSTRUCTIONS

The chipper/shredder should be used only on the Steiner 420, 425 and 525 power units equipped with the required chipper/shredder electrical outlet. (This electrical outlet is shipped with each chipper/shredder. See Page 27 for electrical outlet installation.)

NOTE: The PTO drive line is subject to shock loads while using the chipper/shredder. Therefore, the chipper/shredder is not recommended for use on the Steiner 220 power unit. Damage to the hydrostatic pump may result.

To mount the Chipper/Shredder do the following steps:

1. Open quick hitch latches. Drive tractor into position, aligning the quick hitch. Be sure that both latches are fully engaged and locked.
2. Stop engine! Do not attempt to install drive belt with engine running.
3. Release double idler assembly to facilitate easy installation of the B-41 drive belt. Put belt over drive pulley and engage or adjust double idler assembly. (See Power Unit Operator's Manual for PTO belt tension adjustment.)
4. Plug emergency stop cable into chipper/shredder electrical outlet on tractor. Be certain the Emergency Stop Switch is pulled out for normal operation. Do not operate the Chipper/Shredder without this cable plugged in.
5. Remove clip pin and rotate stand to highest position. Reinsert clip pin.
6. A rear weight bar with 4 weights is recommended to provide additional stability in transport.
7. Start engine, engage PTO and check operation of Emergency Stop Switch. (See photo below)



INSTALLATION INSTRUCTIONS FOR EMERGENCY STOP SWITCH OUTLET ON MODEL 420

Model 420

1. Disconnect the battery ground cable.
2. On model 420 with Onan engine, mount the electrical outlet on the left side of the black upper grille panel with two 1/4 x 3/4 flange bolts and nuts. Choose a location using the existing slots in the panel. On models with Kubota engines, the outlets are mounted on the right side.
3. Connect the new harness (Part No. 30—174) to the electrical outlet following the wiring diagram on Page 20. Connect the brown wire to the "W" terminal, the green wire to the "G" terminal and the black wire to the "BK" terminal.
4. Locate the safety interlock relay under the dash and find the brown wire in the bulk connector. Remove the bulk connector and carefully release the brown wire from the connector with a small blade pocket screwdriver. Place the single black plastic connector on this brown wire and connect to the new harness matching connector. This is the seat switch wire.
5. Locate the brown jumper wire on the wiring harness. (connected with a blue 3M connector) Plug the end of the brown jumper wire into the safety relay bulk connector where the brown wire was removed in step 3. Connect the bulk connector to the safety relay.
6. Route the white wire to the ignition switch. Find the accessory terminal (white wire). Remove the wire and place the double male spade adapter on the switch. Replace the wire and connect the white wire to the other terminal of the double spade. NOTE: On Kubota tractors, cut the spade terminal off the white wire, crimp the enclosed ring terminal to the white wire and attach it to the accessory terminal of the ignition switch.
7. Check the wiring diagram and snap the brown seat switch wire in the new relay bulk connector aligned with 87A on the new relay. The brown wire from the safety relay aligns with 30. The black wire aligns with 85 and the white wire with 86. Snap these in place and push the connector on the relay.
8. Mount the new relay by drilling a hole in the battery tray of the Onan power units. On Kubota units, drill a hole at a suitable location on the side of the dash panel.
9. Connect the green wire ring terminal to a suitable ground. Tie all wires to keep them from contact with moving parts or exhaust system.
10. Reconnect the battery cable, plug in the chipper/shredder cable and test the emergency stop switch for proper operation. Pull the switch out for normal operation. Start engine and engage the PTO. Push in for emergency stop.

INSTALLATION INSTRUCTIONS FOR EMERGENCY STOP SWITCH OUTLET ON MODEL 425

Model 425 Tractors with electric clutch:

1. Disconnect the battery ground cable.
2. Mount the Electrical outlet on the right side of the black upper grille panel with two 1/4 x 3/4 flange bolts and nuts. Choose a location using the existing slots in the panel.
3. Connect the new harness (Part No. 30—175) to the electrical outlet following the wiring diagram on Page 20. Connect the brown wire to the "W" terminal, the green wire to the "G" terminal and the black wire to the "BK" terminal.
4. Locate the clutch relay behind the grille and find the brown wire in the bulk connector. Remove the bulk connector and carefully release the brown wire from the connector with a small blade pocket screwdriver. This is the seat switch wire. Insert the brown jumper wire (the one connected with a blue 3M connector) from the new harness in its place and push the bulk connector on the clutch relay as before.
5. Route the white wire to the ignition switch. Find the accessory terminal (white wire). Remove the wire and place the double male spade adapter on the switch. Replace the wire and connect the white wire to the other terminal of the double spade. NOTE: On Kubota tractors, cut the spade terminal off the white wire, crimp the enclosed ring terminal to the white wire and attach it to the accessory terminal of the ignition switch.
6. Check the wiring diagram and snap the brown seat switch wire in the relay bulk connector aligned with 87A on the relay. The brown wire from the new harness aligns with 30. The black wire aligns with 85 and the white wire with 86. Snap these in place and push the connector on the relay.
7. Mount the relay on the rear side of panel using the clutch relay mounting screw.
8. Connect the green wire ring terminal to a suitable ground. Tie all wires to keep them from contact with moving parts or exhaust system.
9. Reconnect the battery cable, plug in the chipper/shredder cable and test the emergency stop switch for proper operation. Pull the switch out for normal operation. Start engine and engage the PTO. Push in for emergency stop.
10. Proper operation will disengage the electric PTO clutch when the emergency stop switch is pushed "IN". Do not use the emergency stop switch as a PTO operational switch. To restart, disengage tractor PTO switch, pull emergency knob "OUT" and engage PTO in the normal manner.

Model 425 Tractors without electric clutch:

1. Disconnect the battery ground cable.
2. Mount the Electrical outlet on the right side of the black upper grille panel with two 1/4 x 3/4 flange bolts and nuts. Choose a location using the existing slots in the panel.
3. Connect the new harness (Part No. 30—174) to the electrical outlet following the wiring diagram on Page 20. Connect the brown wire to the "W" terminal, the green wire to the "G" terminal and the black wire to the "BK" terminal.
4. Locate the black module under the dash and find the brown wire in the bulk connector. Remove the bulk connector and carefully release the brown wire from the connector with a small blade pocket screwdriver. Place the single black plastic connector on this brown wire and connect to the new harness matching connector. This is the seat switch wire.
5. Locate the brown jumper wire on the wiring harness. (connected with a blue 3M connector) Plug the end of the brown jumper wire into the module bulk connector where the brown wire was removed in step 3. Connect the bulk connector to the module.
6. Route the white wire to the ignition switch. Find the accessory terminal (white wire). Remove the wire and place the double male spade adapter on the switch. Replace the wire and connect the white wire to the other terminal of the double spade. NOTE: On Kubota tractors, cut the spade terminal off the white wire, crimp the enclosed ring terminal to the white wire and attach it to the accessory terminal of the ignition switch.
7. Check the wiring diagram and snap the brown seat switch wire in the relay bulk connector aligned with 87A on the relay. The brown wire from the module aligns with 30. The black wire aligns with 85 and the white wire with 86. Snap these in place and push the connector on the relay.
8. Mount the relay using one of the module mounting screws.
9. Connect the green wire ring terminal to a suitable ground. Tie all wires to keep them from contact with moving parts or exhaust system.
10. Reconnect the battery cable, plug in the chipper/shredder cable and test the emergency stop switch for proper operation. Pull the switch out for normal operation. Start engine and engage the PTO. Push in for emergency stop.
11. Proper operation will stop the engine when the emergency stop switch is pushed "IN". To restart, disengage PTO and pull emergency knob "OUT".

TYPICAL EMERGENCY STOP SWITCH WIRING DIAGRAM

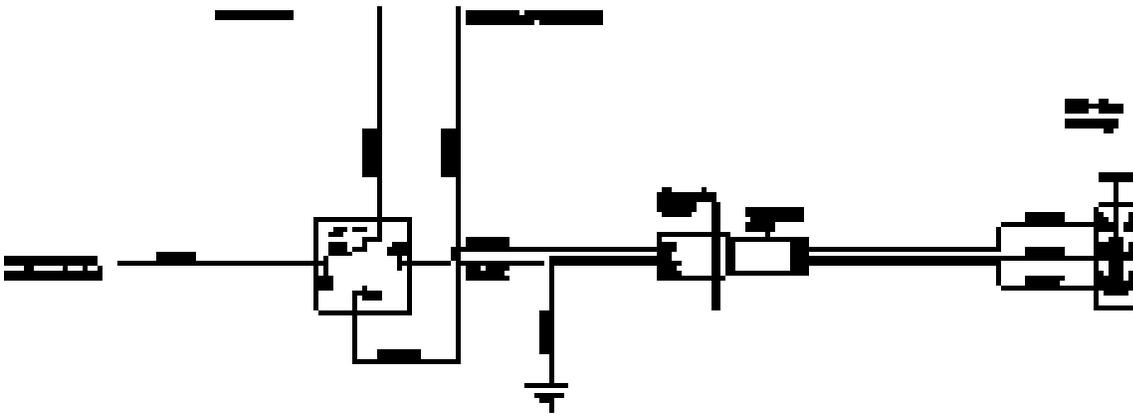
Two wiring harnesses are shipped with each Chipper/Shredder to adapt to the following tractors:

Model 420 and 425 Tractors without electric clutch

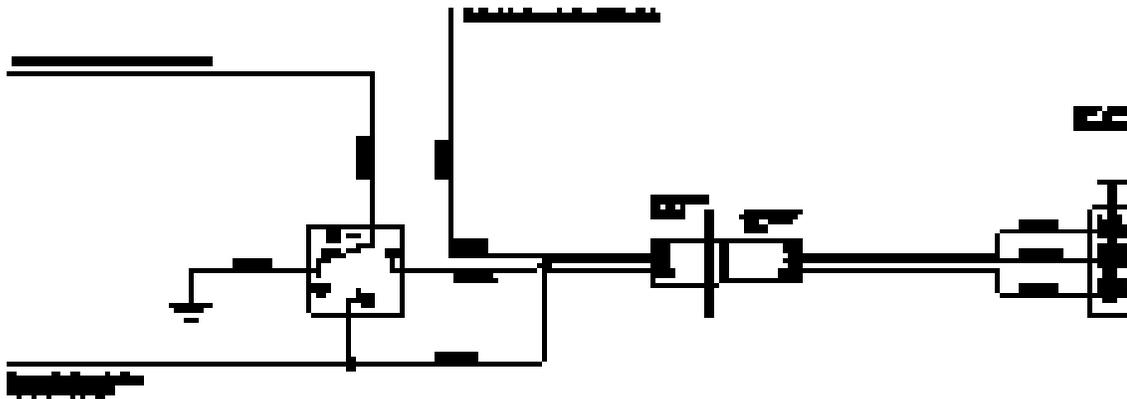
Part No.	Description
30-174	Harness with 44" black and brown wires,...and 20" white wire.

Model 425 Tractors with electric clutch

Part No.	Description
30-175	Harness with 33" black and brown wires,...and 57" white wire.



INSTALLATION INSTRUCTIONS FOR EMERGENCY STOP SWITCH OUTLET ON MODEL 525



**Diagram No. 2 for Model 525 Tractors w/o 2 Second Delay
(before serial no. 1197)**

Model 525 Tractors:

1. Disconnect the battery ground cable.
2. Mount the electrical outlet on the left side of the black upper grille panel with two 1/4 x 3/4 flange bolts and nuts. Choose a location using the existing slots in the panel.
3. Remove the dash access panel. Starting at the dash area, route the new harness (the end without terminals) along the existing wiring harness through the center pivot area of the tractor. Continue routing until the wires reach the electrical outlet.
4. Connect the new harness (Part No. 30—187) to the electrical outlet following the wiring diagram on this page. Connect the blue wire to the “W” terminal, the green wire to the “G” terminal and the black wire to the “BK” terminal.
5. Locate the clutch relay and circuit breakers in the dash area. Near the breakers find the harness with two blue wires that comes from the seat switch. Disconnect the bullet connector on the blue seat switch wire and connect the female bullet connector of the 5 inch brown wire to the male bullet connector on the blue seat switch wire. Connect the male bullet of the new green wire to the female bullet connector of the blue wire that goes to the front lift limit switch.
6. Route the blue wire from the new harness to the PTO switch. Find the PTO switch terminal with the blue wire attached. Remove the wire and place the double male spade adapter on the switch. Replace the wire and connect the new blue wire to the other terminal of the double spade.
7. Check the wiring diagram and snap the 5 inch brown seat switch wire in the relay bulk connector aligned with 87A on the relay. The green wire from the new harness aligns with 30. The black wire aligns with 85 and the 10 inch black wire with ring terminal with 86. Snap these in place and push the connector on the safety relay.
8. Mount the safety relay on the left side of mounting panel using the clutch relay mounting screw.
9. Connect the black wire ring terminal to a suitable ground. Tie all wires to keep them from contact with moving parts or exhaust system.
10. Reconnect the battery cable, plug in the chipper/shredder cable and test the emergency stop switch for proper operation. Pull the switch out for normal operation. Start engine and engage the PTO. Push in for emergency stop.
11. Replace all shields.
12. Proper operation will disengage the electric PTO clutch when the emergency stop switch is pushed “IN”. To restart, pull emergency knob “OUT” and engage PTO in the normal manner.

Assembly Instructions for: MODEL CS313 CHIPPER / SHREDDER BLOWER

REFER TO PARTS SECTION FOR IDENTIFICATION OF PARTS

1. Remove hinge pin (Fig. 4, Item 1) and remove discharge chute.
2. Remove the end cap from the rotor shaft.
3. Hold blower up to the main frame and secure with the new hinge pin (Fig. 4, Item 1) supplied with the blower assembly.
4. Install pulley, bushing and key (Fig. 4, Item 29, 30 & 31) onto the rotor shaft. Do not secure to shaft at this time.
5. Install belt onto the inside groove on the rotor shaft pulley, and onto the blower pulley. Idler should run on the inside of belt for correct tension. (See Photo 1) Align pulleys to within 1/16". Tighten all pulleys on shafts.
6. Install belt guard support bracket (Fig. 4, Item 33) onto top 1/2" bolt for bearing on main frame and secure with 1/2" lock nut. (Fig. 4, Item 32)
7. Install belt guard (Fig. 4, Item 27) with (4) 5/16" X 3/4" bolts and washers.
8. Install blower spout (Fig. 4, Item 11) on the blower tube with (2) 5/16" X 3/4" carriage bolts, (1) 5/16" locknut and (1) spout knob. Install blower tube onto blower assembly and secure with clamp. (See Photo 2)

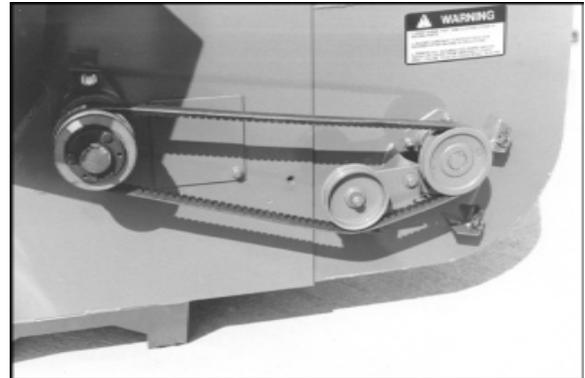


PHOTO 1



PHOTO 2

OPERATING PRECAUTIONS

⚠ DANGER

This chipper/shredder is designed and tested to offer reasonably safe service, however, failure to operate it in accordance with the following instructions may result in personal injury or death.

OPERATING INSTRUCTIONS

1. Mount the chipper/shredder according to instructions on Page 7.
A rear weight bar with 4 weights is recommended.

⚠ CAUTION

2. Wear safety glasses at all times while operating the machine. Also wear heavy boots, gloves, and adequate clothing to protect from branches and other sharp or harmful objects. Avoid wearing loose-fitting clothing.
3. Do not operate the chipper/shredder in the vicinity of bystanders. Do not allow minors or the inexperienced to operate this machine.
4. By using the front lift to transport the machine, move it to a clear level area outdoors. Set the parking brake on the tractor. Do not operate the chipper/shredder on a paved, concrete or hard gravel surface. Discharged material may rebound. Lower machine before operating. Do not operate in transport position.
5. Before starting the machine, make sure the cutting chamber is empty.
6. When feeding shreddable material into the machine, be extremely careful that pieces of metal, rocks, bottles, cans or other foreign objects are not fed into the feeding chamber.
7. If the cutting mechanism strikes any foreign object, or if the machine should start making an unusual

⚠ WARNING

If the machine becomes jammed or becomes clogged, immediately push the emergency stop switch, stop engine and allow the machine to come to a complete stop. Take the following steps:

- a. Inspect for damage.
- b. Clear the debris.
- c. Replace or repair any damaged parts.
- d. Check for and tighten any loose parts.

⚠ CAUTION

Keep body away from the feed opening. Do not allow hands, feet or clothing inside the feeding chamber or discharge chute. Do not overreach. Keep proper balance and footing at all times.

SHREDDING INSTRUCTIONS

1. Place material to be shredded (leaves, garden debris, sticks and branches up to 1-1/2" diameter and 24" long, etc.) into the hopper.
2. Feed material evenly into the shredder so that the tractor does not lug down or the shredder become clogged. If necessary, use the hopper lid to push the material through the inlet guards. If the machine becomes plugged it may be necessary to remove the discharge shield and screen to clean rotor. Branches or items that plug or cause the machine to stall should be fed slowly and carefully.
3. If equipped with a blower, it is recommended to alternate between dry and green material to avoid blower plugging.



CHIPPING INSTRUCTIONS

1. Select limbs that are up to 4 inches in diameter. Trim side branches that do not fit into the chipper chute. Small diameter branches can be held together in a bundle and fed in simultaneously.
2. Place limb, butt end first, into the chipper chute until it contacts the chipper blades. The actual feed rate of the limb into the chipper will depend on the type of material fed, and sharpness of the cutting blades. Alternately insert and retract the limb or insert continuously at a rate that will not stall the tractor. Rotating the branch as it is fed will improve cutting action. The chipping knives will dull with use and require periodic sharpening. Refer to Page 11 for instructions to sharpen chipper knives.



STOPPING INSTRUCTIONS

⚠ WARNING

Do not leave machine unattended, or attempt any inspection or service unless the PTO is disengaged and tractor engine is shut off. Allow machine to come to a complete stop.

To stop machine proceed as follows:

1. **Move tractor throttle to slow position.**
2. **Disengage PTO and shut off tractor engine.**
3. **Allow machine to come to a complete stop.**

NOTE: The rotor is heavy and has inertia that will make the rotor continue to turn for some time after the tractor has been shut off. The stopping time can be shortened by inserting a branch in the chipper chute so that it contacts the knives and slows the rotor to a complete stop.

SERVICE SCHEDULE

Daily:

- Check for any signs of loose bolts and tighten as needed.
- Check chipper knives and sharpen or adjust as needed. (See Page 13)

25 Hour:

- In addition to daily service, remove belt shields and check drive belts for wear or cracking. Replace if worn. (See Page 14)
- Grease rotor bearings and drive shaft bearings.

100 Hour or Annual:

- Remove discharge shield and discharge screen and check rotor. Inspect chipper knives and shredder sections for wear. Replace worn parts for efficient operation. (See Pages 14 & 15)

Storage:

- Thoroughly clean the machine and store in a dry place to prevent rusting of rotor parts.

MAINTENANCE AND ADJUSTMENTS

⚠ WARNING

Before inspecting or servicing any part of the machine, disengage PTO and make sure all moving parts have come to a complete stop. The chipping knives and shredding sections are sharp! Use care when working on machine to avoid injury.

SHARPENING CHIPPER KNIVES

It is recommended that the chipper knives are sharpened every 5 to 15 hours of chipper operation, depending on the type of wood fed into the chipper.

To remove the chipper knives for sharpening, first remove the discharge shield and the discharge screen. Remove the two 5/16 inch retaining bolts and pull the screen outward. Remove the knife access cover. Rotate the rotor so that the bolts holding the chipper knife are accessible. Remove the two bolts holding the knife and the knife itself. Repeat for all 4 knives.

Grind the knife at 45 degrees. (See Figure A) The knives can be ground on a bench grinder or by a professional. Be careful when grinding so that the knife material does not get too hot and change color, this will remove the knife's special heat treated properties. Use short grinding times and cool with water. Try to remove an equal amount off each knife to maintain balance. Replace the chipper knives and tighten bolts to 20 foot pounds. Replace the discharge screen.

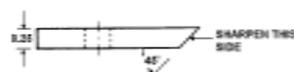


FIGURE A

ADJUSTING KNIFE CLEARANCE

The chipper knife should clear the chipping block by 1/8 inch. (See Figure B) To adjust the knife clearance, proceed as follows:

- A. Remove the belt shield, discharge shield, and the discharge screen. Remove the shaft cover on the front side.
- B. Loosen the two set screws holding the set collar at the front rotor bearing. Loosen the set screws holding the lock collars on the front and rear rotor bearings.
- C. Use a punch and hammer and tap the collars in a direction opposite shaft rotation so they can rotate freely.
- D. Using a soft face mallet, tap the end of the rotor shaft to obtain 1/8" clearance between the chipper knife and the chipper block. (See Figure B) Knife clearance can be checked at the chipper inlet chute. Rotate the rotor and check the clearance on all chipper knives.
- E. When the clearance has been set, tighten the eccentric lock collars on the bearings by rotating them in the direction of shaft rotation. Using a punch and hammer, "set" them with a positive hammer tap. Tighten the lock collar set screws. Slide the set collar against the front bearing lock collar and tighten the two set screws.
- F. Check the double drive belts for proper alignment. It may be necessary to move the pulley on the rotor shaft an equal distance the rotor was moved.
- G. Make sure all set screws are tight and replace discharge screen and all shields which were removed.

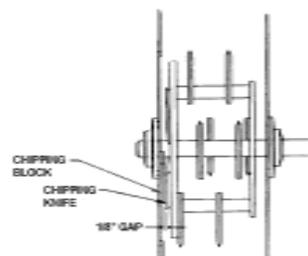


FIGURE B

MAINTENANCE AND ADJUSTMENTS

WARNING

Before inspecting or servicing any part of the machine, disengage PTO and make sure all moving parts have come to a complete stop. The chipping knives and shredding sections are sharp! Use care when working on machine to avoid injury.

SHREDDER SECTIONS

The serrated self sharpening shredder sections are designed to offer long life and can be reversed if they become dull. To remove or replace the sections, proceed as follows:

- A. Remove discharge shield, discharge screen and knife access cover.
- B. Work with one section shaft at a time. Remove the #10-24 bolt from the section shaft. The shaft can be removed through the access hole.
- C. Remove sections and section spacers. Be careful to keep track of the order the spacers were installed on the shafts so they can be returned to the original locations. If the spacers are not installed properly, the rotor will be out of balance and also will not have proper shredding action.
- D. Reverse or replace sections and reassemble into the rotor. Reinstall #10-24 bolt and locknut through spacer and torque to 36 inch pounds.
- E. Complete service of all 6 shafts and replace the knife access cover, discharge screen and discharge shield.

BELT REPLACEMENT

Check the condition of the double drive belts every 30 hours of operation or annually, whichever occurs first. Only replace belts in sets.

To replace belts proceed as follows:

- A. Disengage PTO and stop engine.
- B. Remove belt shields.
- C. Remove belt idler spring and remove belts from pulleys.
- D. Remove 4 bolts attaching hitch assembly to main frame and completely remove belts.
- E. Place new belts around the hitch frame and attach the hitch assembly to the main frame.
- F. Position belts on the pulleys and attach the idler arm spring.
- G. Check the attachment drive belt and replace if needed. Replace belt shields.

CLEANING PLUGGED ROTOR

If too large of material or too much material is fed into the chipper/shredder, it may become plugged. To clear plugged rotor, proceed as follows:

- A. Disengage PTO and stop engine.
- B. Remove discharge shield and discharge screen.
- C. Clean debris out of the shredding rotor. Turn the rotor by hand to be sure it is free to rotate.
- D. Replace discharge screen and discharge shield.
- E. See also Cleaning Plugged Blower.

CLEANING PLUGGED BLOWER

If too much green material is fed into the chipper/shredder the blower may become plugged. To clear the blower, proceed as follows:

- A. Disengage PTO and stop engine.
- B. Remove blower drive belt guard, and remove drive belt.
- C. Remove the Blower discharge tube.
- D. Tilt the blower away from the main frame and clean debris out of blower housing.

TROUBLESHOOTING

SYMPTOM: Rotor stops or engine stalls.

Possible Cause

1. Obstructed discharge.
2. Plugged rotor.

Remedy

1. Use branch or similar object to clear discharge.
2. Clear rotor. (See Page 16)

SYMPTOM: Hard to feed chipper or excessive power needed to chip.

Possible Cause

1. Obstructed discharge.
2. Dull chipper knives.
3. Improper knife clearance.

Remedy

1. Use branch or similar object to clear discharge.
2. Sharpen knives. (See Page 15)
3. Adjust knife clearance. (See Page 15)

SYMPTOM: Shredder requires excessive power or stalls.

Possible Cause

1. Obstructed discharge.
2. Plugged rotor.
3. Green material will not discharge.

Remedy

1. Use branch or similar object to clear discharge.
2. Clear rotor, feed material into hopper more slowly. (See Page 15)
3. Alternately feed dry material, or allow material to dry before shredding.

SYMPTOM: Drive belts squealing or smoking.

Possible Cause

1. Plugged rotor.
2. Loose or worn belts.

Remedy

1. Clear rotor. (See Page 15)
2. Adjust belt tension or replace belts if needed.

SYMPTOM: PTO will not engage or engine stops when PTO is engaged.

Possible Cause

1. Emergency stop switch is "IN".

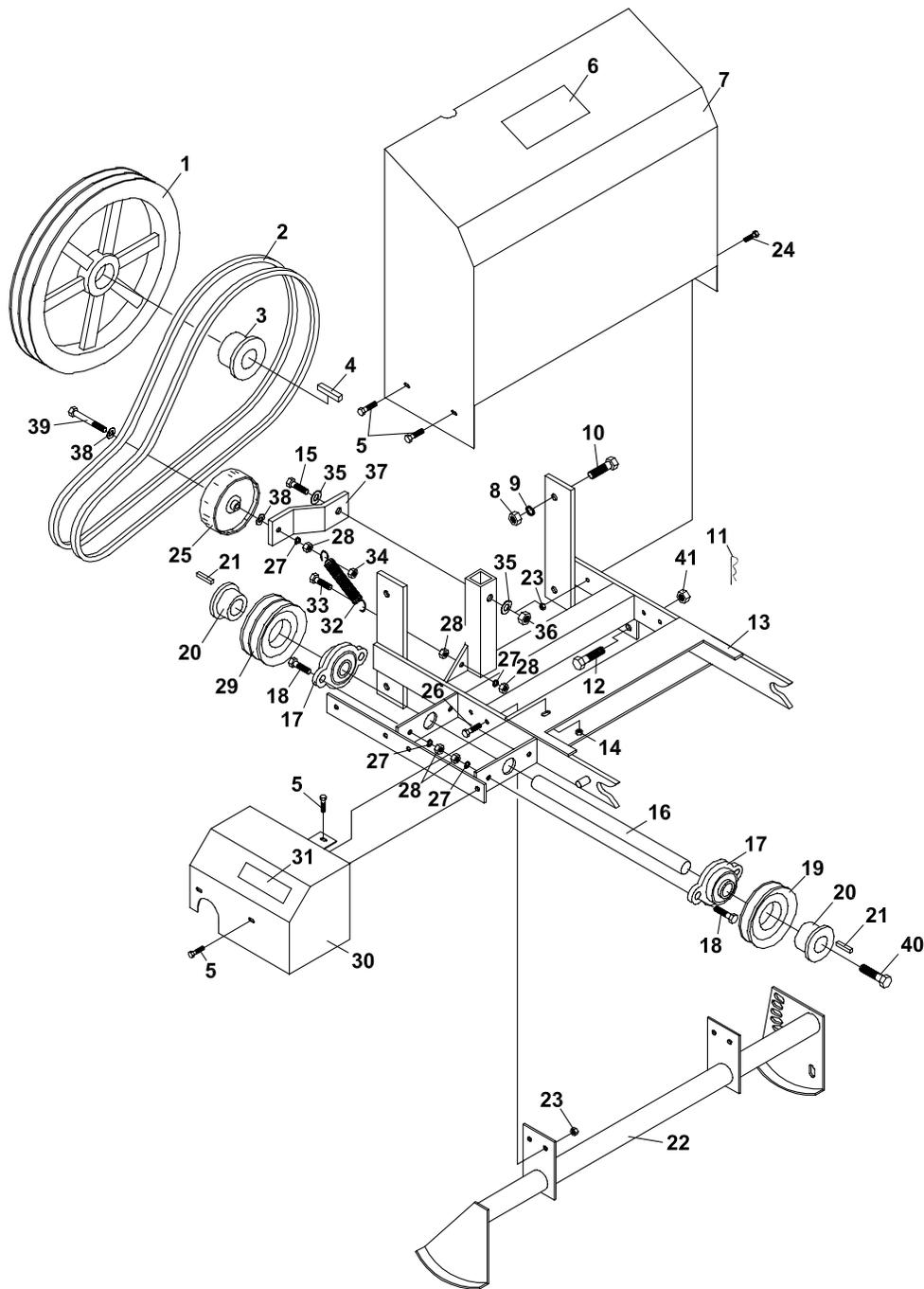
Remedy

1. Pull emergency stop switch "OUT" for normal operation.

HITCH & DRIVE PARTS

CHIPPER/ SHREDDER

FIGURE 1



CHIPPER/ SHREDDER

HITCH & DRIVE PARTS

FIGURE 1

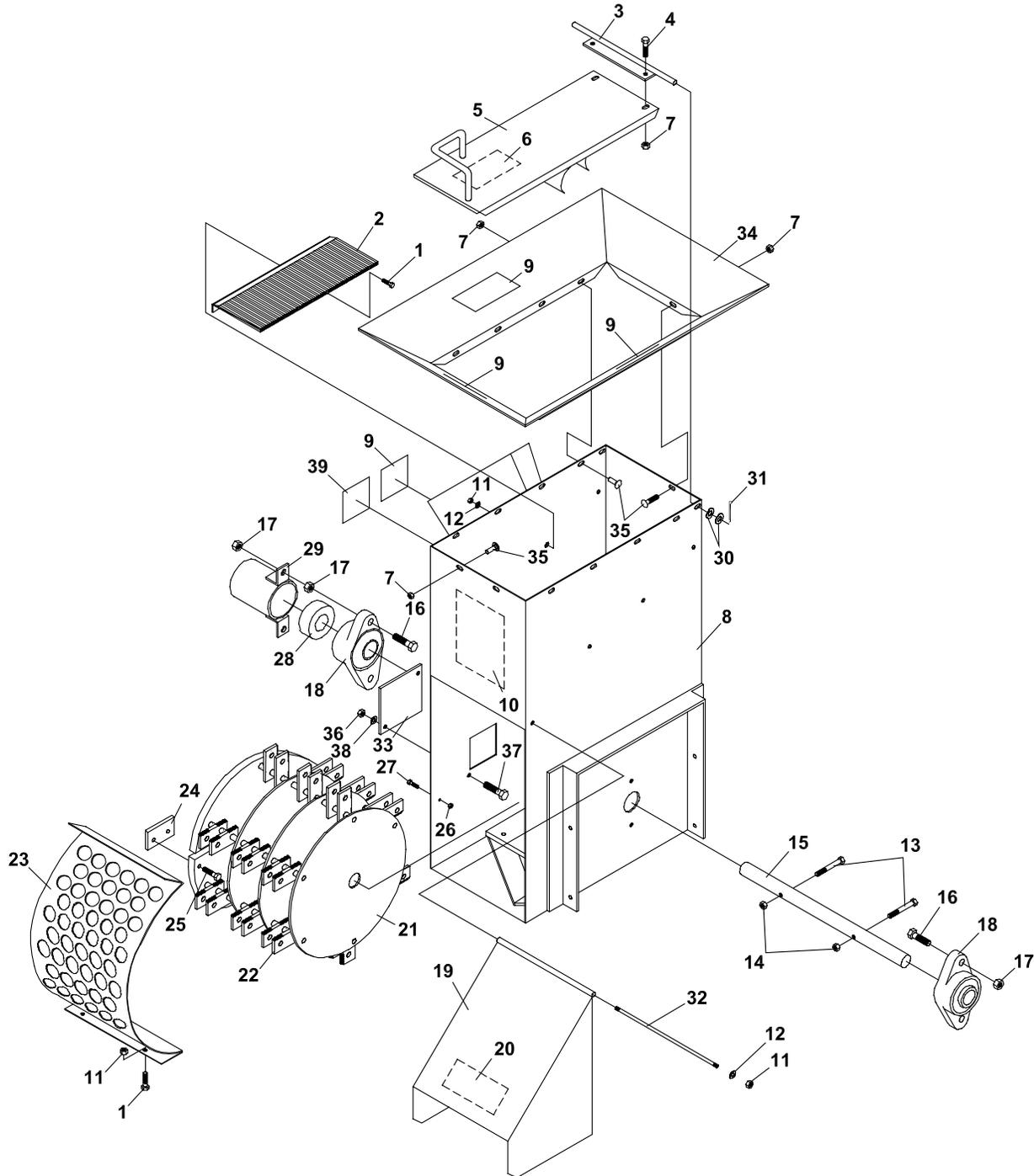
ITEM	PART NO.	DESCRIPTION	QTY	ITEM	PART NO.	DESCRIPTION	QTY
1-1	83-2TB124	PULLEY	1				
1-2	81-B054	BELT-B54	2				
1-3	83-Q124	BUSHING-Q1 X 1-1/2	1				
1-4	64164-26	KEY-3/8x3/8x1-1/2 SQ	1				
1-5	64139-04	BOLT-WLF 1/4-20X3/4	5				
1-6	00-093	DECAL	1				
1-7	60-576	SHIELD, IDLER PULLEY	1				
1-8	64025-09	HEX, NUT 1/2-13	4				
1-9	64006-05	LOCKWSHR-HELICAL 1/2	4				
1-10	64123-39	BOLT-HEX 1/2-13X1-1/4	4				
1-11	02-PP0524	PRESTO PIN, 5/32 X 2-15/16	1				
1-12	99-F36	BOLT, LEG RETAINER	1				
1-13	62-757	FRAME, QUICK HITCH ARMS	1				
1-14	64141-2	NUT-WLF 1/4-20	1				
1-15	64123-125	BOLT-HEX 1/2-13X2-3/4	1				
1-16	80-244	SHAFT, DRIVE	1				
1-17	4138878	2-BOLT FLANGE BRG, 1"	2				
1-18	64123-16	BLT-HEX 3/8-16X1-1/4	4				
1-19	83-BK52H	PULLEY, BK52H H BUSHING	1				
1-20	83-H16	BUSHING	2				
1-21	64164-10	1/4X1/4X1-1/4 MACH KEY	2				
1-22	62-758	FRAME, R SUPPORT LEGS	1				
1-23	64141-6	NUT, 5/16-18	5				
1-24	64139-08	BOLT-5/16-18X3/4 WLF	1				
1-25	83-028	FLAT IDLER	1				
1-26	99-K02	BOLT, FLANGE 5/16-18 X 1	4				
1-27	64006-03	LOCKWASHER-3/8	6				
1-28	64025-05	NUT-3/8-16 HEX	7				
1-29	83-2BK50H	PULLEY	1				
1-30	60-575	SHIELD, DRIVE PULLEY	1				
1-31	00-025	DECAL-HANDS FROM BELT	1				
1-32	41-010	SPRING	1				
1-33	64123-70	BOLT-HEX 3/8-16X1-1/2	1				
1-34	64229-03	LOCKNUT-NYLON 3/8-16	1				
1-35	64163-67	WASHER-.516X1X12GA	2				
1-36	64229-05	LOCKNUT, 1/2-13 NYLON	1				
1-37	40-300	IDLER ARM, BELT	1				
1-38	64163-61	WSHR .81X.406X16	A/R				
1-39	64123-88	BOLT, 3/8-16X2-3/4 HEX	1				
1-40	64123-114	BOLT-HEX 1/4-20X1	4				
1-41	64141-13	NUT WLF 1/2-13	1				
*	81-B041	BELT, B41 85440	1				
*	30-004B	TERMINAL,FEM	1				

* NOT ILLUSTRATED

FRAME PARTS

CHIPPER/ SHREDDER

FIGURE 2



CHIPPER/ SHREDDER

FRAME PARTS

FIGURE 2

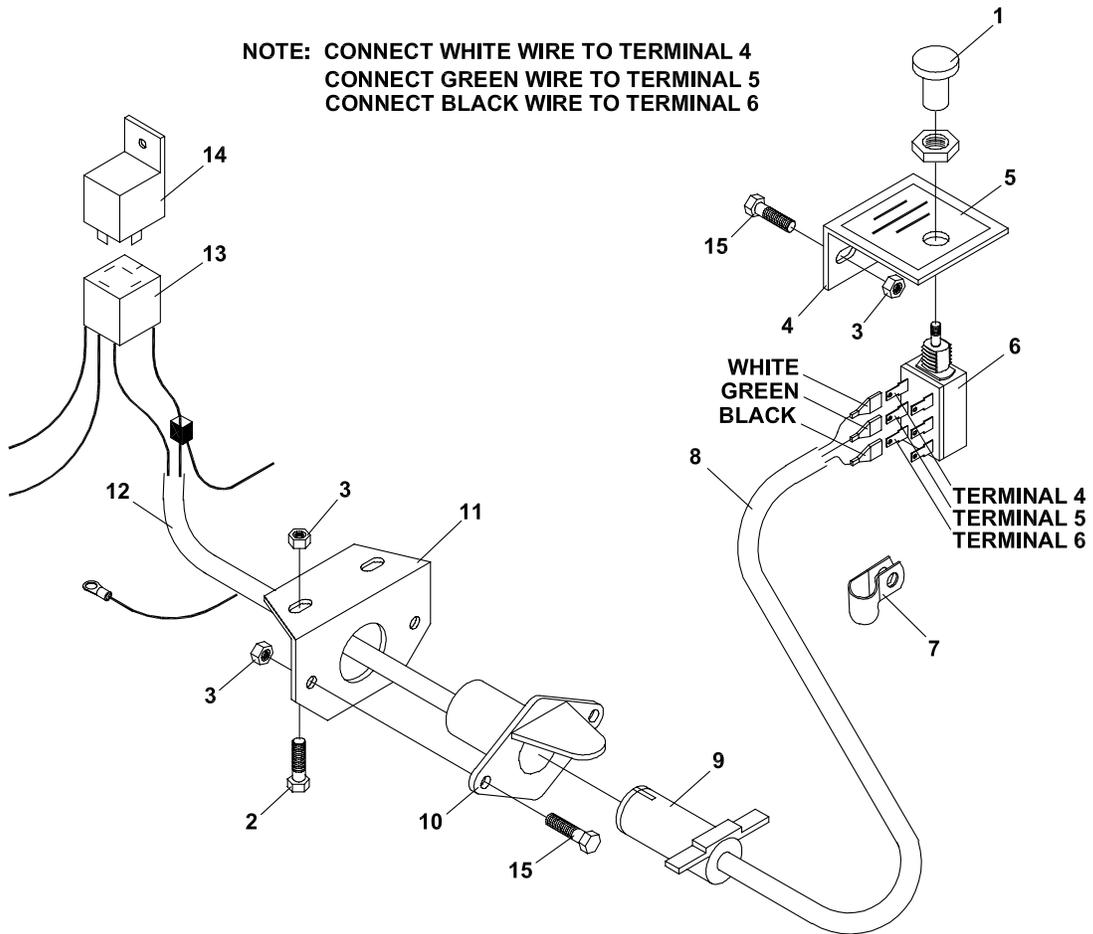
ITEM	PART NO.	DESCRIPTION	QTY	ITEM	PART NO.	DESCRIPTION	QTY
2-1	64123-54	BOLT, 5/16-18X3/4 HEX	8	2-33	87-CS70396	COVER-KNIFE ACCESS	1
2-2	87-CS16068	BRUSH-INLET	2	2-34	60-596	HOPPER	1
2-3	64-732	HINGE, LID CS312	1	2-35	97-0506	CARRIAGE BOLT	11
2-4	64139-08	BOLT-5/16-18X3/4 WLF	2	2-36	64229-03	LOCKNUT-NYLON 3/8-16	2
2-5	60-578	SHIELD, LID F/CS312	1	2-37	64123-50	BOLT-HEX 3/8-16X1	2
2-6	00-093	DECAL	1	2-38	64163-31	WSHR-25-64 X 1 X 12GA	2
2-7	64141-6	NUT, 5/16-18	13	2-39	00-155	DECAL, CS312 MODEL	1
2-8	62-787	MAIN FRAME HOUSING	1				
2-9	00-152	DECAL-DANGER BLADES	4				
2-10	00-156	DECAL-OPERATING INST.	1				
2-11	64229-02	LOCKNUT-NYLON 5/16-18	12				
2-12	64163-04	25/64X5/8X16GA WASHER	8				
2-13	64123-82	BOLT-HEX 3/8-16X2-1/2	2				
2-14	87-CS15388	LOCKNUT-3/8 NYL	2				
2-15	87-CS70379	SHAFT-ROTOR	1				
2-16	64123-24	BLT-HEX 1/2-13X2	4				
2-17	99-AC08	LOCKNUT-CENTER 1/2	2				
2-18	87-CS16004	BEARING-2 BLT FLG 1-1/2"	2				
2-19	60-577	CHUTE-DISCHARGE	1				
2-20	00-153	DECAL-DANGER BLADES	1				
2-21	87-CS70969	ROTOR ASSY	1				
		(INCLUDES ITEMS 22 & 24)					
	87-CS72689	WLDMT-ROTOR	1				
2-22	87-CS70972	SHREDDER KIT:	1				
		CONSISTS OF:					
	87-CS70856	SHREDDER KNIFE	36				
	87-CS70381	SHAFT-SECTION KNIFE	6				
	87-CS70367	SPCR-0.75 X 0.59	10				
	87-CS70368	SPCR-0.75 X 0.59 W/HOLE	2				
	87-CS70369	SPCR-0.75 X 1.18	8				
	87-CS70370	SPCR-0.75 X 1.18 W/HOLE	4				
	87-CS70371	SPCR-0.75 X 1.47	18				
	87-CS17898	CAP SCREW-10-24 X 1-1/4	6				
	87-CS15397	LOCKNUT-10-24 NYL	6				
2-23	87-CS70332	COARSE SCREEN	1				
2-24	87-CS72493	KNIFE KIT	1				
		(SET OF 4 INCLUDES ITEM 25)					
2-25	64123-68	BOLT-HEX 5/16-18X1	8				
2-26	64141-2	NUT-WLF 1/4-20	1				
2-27	64139-04	BOLT-WLF 1/4-20X3/4	1				
2-28	86-049	SET COLLAR	1				
2-29	87-CS70426	END CAP	1				
2-30	64163-67	WASHER-.516X1X12GA	2				
2-31	64140-1	COTTER PIN-1/8X1	2				
2-32	40-312	BOLT-DISCHG CHUTE MNT	1				

* NOT ILLUSTRATED

EMERGENCY STOP SWITCH PARTS

CHIPPER/ SHREDDER

FIGURE 3



CHIPPER/ SHREDDER

EMERGENCY STOP SWITCH PARTS

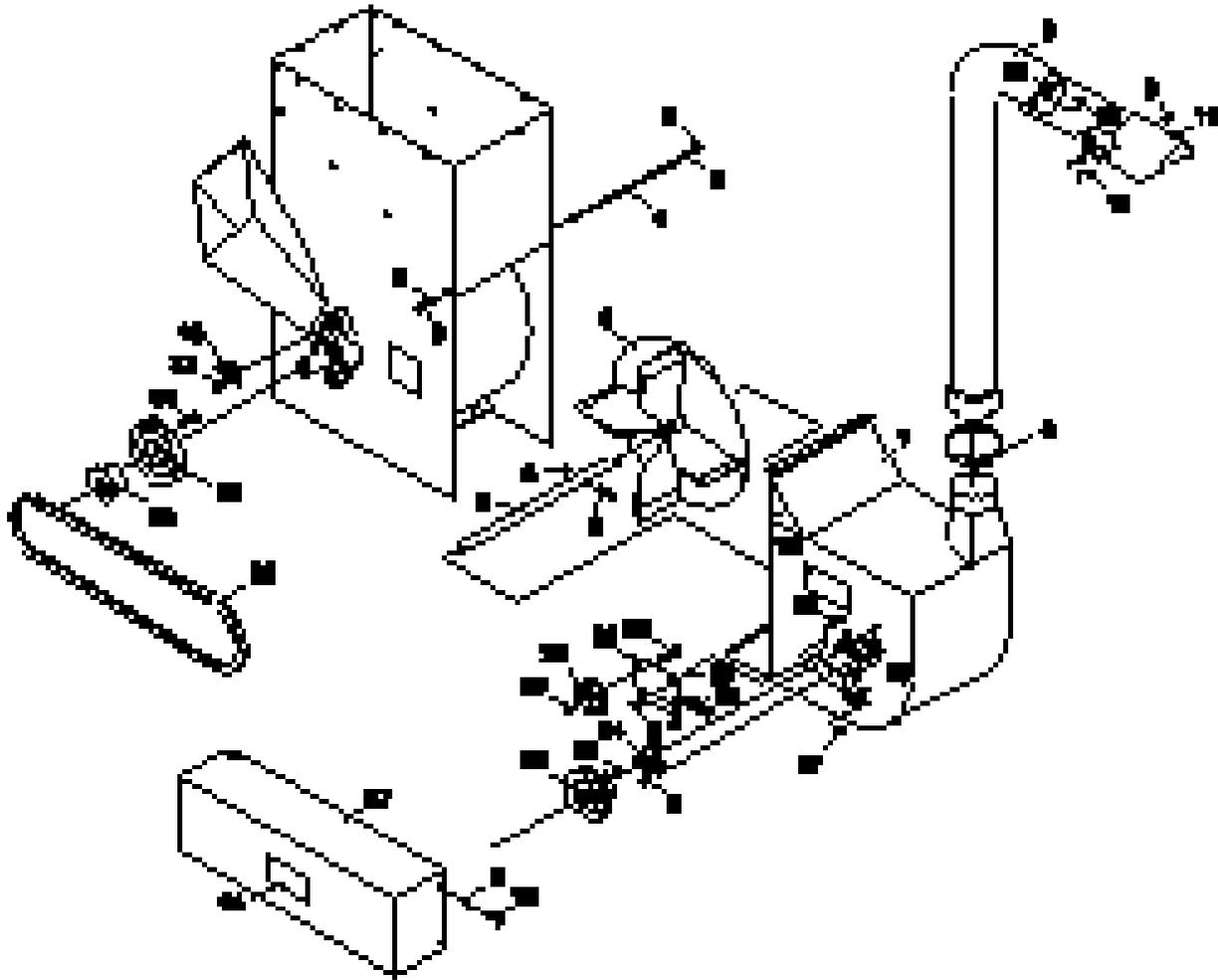
FIGURE 3

ITEM	PART NO.	DESCRIPTION	QTY	ITEM	PART NO.	DESCRIPTION	QTY
3-1	31-020A	KNOB	1				
3-2	64139-04	BOLT-WLF 1/4-20X3/4	2				
3-3	64141-2	NUT-WLF 1/4-20	6				
3-4	64-731	BRKT-SAFETY SWITCH MNT	1				
3-5	00-154	DECAL, EMERGENCY STOP	1				
3-6	31-020	SWITCH,PUSH-PULL	1				
3-7	11-016	WIRECLIP	2				
3-8	30-173	WIRE HARNESS	1				
3-9	30-163	CONNECTOR	1				
3-10	30-164	CONNECTOR	1				
3-11	64-733	BRACKET, PLUG MOUNT	1				
3-12	30-174	WIRE HARNESS	1				
	30-175	WIRE HARNESS	1				
	30-187	WIRE HARNESS	1				
3-13	30-112	CONNECTOR	1				
3-14	35-067	RELAY	1				
3-15	64139-02	BLT-WLF 1/4-20X1/2	4				

CHIPPER/SHREDDER BLOWER PARTS

CHIPPER/ SHREDDER

FIGURE 4



CHIPPER/ SHREDDER

CHIPPER/SHREDDER BLOWER PARTS

FIGURE 4

ITEM	PART NO.	DESCRIPTION	QTY	ITEM	PART NO.	DESCRIPTION	QTY
4-1	87-CS70521	HINGE PIN-5/16 X 14"	1				
4-2	64163-04	25/64X5/8X16GA WASHER	9				
4-3	87-CS15356	LOCKNUT-5/16 NYL	11				
4-4	87-CS70471	IMPELLER	1				
4-5	87-CS70604	SHAFT-BLOWER	1				
4-6	64123-56	BLT-HEX 5/16-18X2	1				
4-7	87-CS70586	HOUSING-BLOWER	1				
4-8	87-CS17960	CLAMP-4-1/4" ID	1				
4-9	87-CS70249	BLOWER TUBE	1				
4-10	64123-54	BOLT, 5/16-18X3/4 HEX	12				
4-11	87-CS70253	SPOUT-BLOWER TUBE	1				
4-12	87-CS15321	KNOB	1				
4-13	90-0508	BOLT,5/16 X 1 NC	1				
4-14	00-093	DECAL	1				
4-15	87-CS70496	BRACKET-BELT GUARD	1				
4-16	00-138	DECAL-DANGER BLADE	1				
4-17	87-CS15402	SPEED NUT-5/16	4				
4-18	87-CS17692	SPRING	1				
4-19	87-CS69126	SPACER-IDLER PIVOT	1				
4-20	87-CS15060	CARRIAGE BOLT-3/8 X 2	1				
4-21	87-CS70475	IDLER PLATE-BLOWER	1				
4-22	87-CS17740	PULLEY-IDLER 3-1/2"	1				
4-23	87-CS15388	LOCKNUT-3/8 NYL	1				
4-24	87-CS17831	BEARING	2				
4-25	87-CS15391	KEY-SQ 1/4 X 2"	1				
4-26	87-CS17958	PULLEY	1				
4-27	87-CS70602	BELT GUARD	1				
4-28	87-CS16086	V-BELT-BX49	1				
4-29	87-CS16016	BUSHING-1-1/2	1				
4-30	87-CS16499	PULLEY-3.6 X 1B-SH	1				
4-31	87-CS15441	KEY-3/8 X 1/4 X 2"	1				
4-32	99-AC08	LOCKNUT-1/2	1				

* NOT ILLUSTRATED

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