4.0 OPERATING INSTRUCTIONS

The GBC Shredmaster 1676S-1 shredder can shred most office paper documents, staples, and standard paper clips, however, the shredding of other metal items may damage the shredder. Plastic materials such as charge cards, covers, inserts, and film may be shredded occasionally, however, extended shredding of such materials will prematurely dull the cutters.

The shredder control panel is shown in Figure 4.0.1. To start shredding, press the white "ON" button and feed the paper to be shredded into the throat of the shredder. Never exceed the maximum capacity of the shredder. To turn the shredder off press the red "OFF/REV" button.

When the shred bag becomes full, the bag sensor flap will automaticallyh turn the shredder off. To resume shredding push the shreds down into the bag or replace it, and then depress the white "ON" button.

If too much paper is inserted into the feed throat, the shredder will automatically reverse to eject the paper, and turn off. To resume shredding, reduct the number of sheets to be shredded and depress the white "ON" button. To clear a severe jam that is not automatically ejected by the shredder, reverse the shredder by depressing the red "OFF/REV" button while pulling firmly on the paper in the throat, or rock the paper through the cutters by alternately depressing the white "ON" and red "OFF/REV" buttons. In cases of severe jams the thermal overload circuit of the motor may be triggered and the unit will appear to be "dead". Wait a few minutes and allow the motor to cool and then clear the jam.

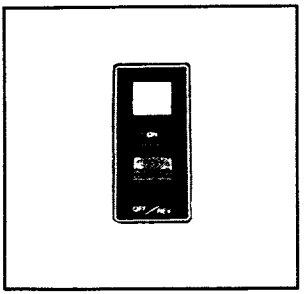

Figure 4.0.1

5.0 TROUBLESHOOTING

5.1 Principles of Operation

The shredder uses rapidly rotating cutting shafts that are driven by an electric motor to shred paper. Both electrical and mechanical principals are involved.

5.1.1 Electrical Operation

The electrical schematic diagram and the electrical wiring diagram for the 115V AC shredders are shown in figures 5.4 and 5.5 respectively. The electrical circuit is comprised of the following electrical components.

1. **Motor (M1).** The motor is a single phase, 1 1/2 Horsepower, continuous duty, AC gearmotor with start and run windings. A centrifugal switch is in series with the start winding. The centrifugal switch is closed when the motor is at rest and opens, to remove power from the start capacitor, when the motor reaches a predetermined speed. The centrifugal switch acts as the trigger to activate the auto - reverse feature of the shredder.

   The motor also contains a thermal protector which will remove power from the run windings of the motor should the motor become overheated.

2. **Start capacitor (C2).** The start capacitor is rated at 374 MF and assists the motor in starting.

3. **Run capacitor (C1).** The run capacitor is rated at 20 MF and assists the motor in starting and running.

4. **Contactor (K1).** This 24 VDC contactor is activated in the start mode only. The coil of the contactor is energized momentarily by the "ON" switch through a circuit between terminals 6 and 8 of the printed circuit board (PCB1). When the contactor is activated, power is supplied to the start winding of the motor through the normally open contacts of the contactor.

5. **Fan (B1).** The fan is connected between the hot side of the AC line and the negative side of the Solid State Relay (K2) and operates whenever the motor is running.

5.1.1 Electrical Operation (Continued)

6. **Solid state relay (K2).** The solid state relay is controlled by a 3-5 VDC circuit from the printed circuit board (PCB1). When the printed circuit board supplies the solid state relay with DC voltage the relay allows AC current from the hot side of the circuit to be supplied to the motor run windings, the right common side of the contactor (K1), one side of the fan (B1) and terminal #10 of the printed circuit board (PCB1).

7. **Flap switch (S4).** The flap switch interrupts the current path to the Printed Circuit Board (PCB1) from the hot leg of the circuit when the shred bag becomes full.

8. **Reverse (S3).** The reverse switch is used to stop the motor when the motor auto-reverses due to a jam. When the motor auto-reverses the reverse switch actuator, mounted to the lower cutter shaft, causes the reverse switch to remove power from the solid state relay which, in turn, creates an open in the hot leg of the circuit to the motor run winding.

9. **Printed Circuit Board (PCB1).** The board supplies 3 to 5 VDC to the solid state relay (K2) and 24 VDC to the coil of the contactor (K1) and is used to reduce arcing at the contact points of the contactor.

10. **"ON" switch (S1).** Is a single-pole, double-throw momentary switch rated for 20 Amperes, 125 VAC.

11. **"OFF/REV" switch (S2).** Is also a single-pole, double-throw momentary switch rated for 20 Amperes, 125 VAC.

    When the "ON" switch (S1) is depressed current momentarily flows from the hot side of the circuit through the flap switch (S4) and through one normally open side of the "ON" switch (S1) to terminal #6 of the printed circuit board (PCB1) which in turn supplies 24 VDC from terminal #8 to the contactor (K1) coil, closing the normally open contacts of the contactor.

5.1.1 Electrical Operation (Continued)

Current also flows momentarily through the other normally open side of the "ON" switch (S1) to terminal #1 of the printed circuit board (PCB1) which in turn supplies 3-5 VDC from terminal #7 of the printed circuit board to the positive side of the solid state relay (K2). A DC circuit is then completed between the negative side of the solid state relay and terminal #13 of the printed circuit board. The solid state relay allows AC power to be supplied to the run windings of the motor and to the start winding of the motor through the normally open contacts of the contactor (K1). Current flowing through the normally open contacts of the contactor causes the motor to run in a forward direction. When the motor reaches a predetermined speed the centrifugal switch opens and power is removed from the start capacitor.

After the "ON" switch (S1) is released current is removed from the coil of contactor (K1) through a time delay circuit in the printed circuit board and at the same time the contacts of the contactor return to the normally open position.

With current flowing to the start winding of the motor through the normally closed contacts of the contactor (K1) the motor is prepared to reverse if a jam should occur. When a jam occurs the motor stops, the centifugal switch closes, and power is supplied to the start capacitor causing the motor to rotate in the reverse direction. As the motor begins to reverse the reverse switch is opened and power is removed from the solid state relay and the run winding of the motor. Therefore, the motor stops running after reversing for a very short period of time.

5.1.1 Electrical Operation (Continued)

After the motor has come to a stop, it may be reversed by holding the "OFF/REV" switch down. A circuit is then completed through one normally open side of the switch to the solid state relay (K2) which allows power to flow to the start and run windings of the motor. Power flows though the start winding in the direction which causes reverse rotation of the motor.

5.1.2 Mechanical Operation

During operation the lower cutting shaft is gear driven by the upper cutting shaft. The upper cutting shaft is chain driven by the motor.

The upper and lower cutting shafts are machined to a close tolerance so that when mated, there is a nominal gap of .001 of an inch between the cutting disks of the upper and lower shafts. Paper inserted between these rotating shafts is sheared. If after use, the gap between the cutter disks exceed .004 of an inch, paper may fold between the cutting disks without shearing. Cutter shaft adjustment is explained in Section 6.0.

5.2 General Troubleshooting

Malfunction corrections are based on visual observation by the operator. The causes of the malfunctions are isolated by the symptom of the malfunction and noting at which point in the operating cycle the malfunction occurred. Malfunctions that occur during operation may be pinpointed to a defective electrical circuit or to a mechanical part by refering to the Principles of Operation in the preceding paragraphs and to the electrical schematic diagram and the electrical wiring diagram.

5.3 Troubleshooting Guide Chart

The troubleshooting guide chart that follows is arranged in order of the normal operational sequence. When a malfunction occurs, read down the SYMPTOM column until you reach the appropriate description for your symptom. Read the corresponding PROBABLE CAUSE, and then perform the recommended procedure in the CORRECTIVE ACTION column. When replacing electrical components having push on type terminals, tag the electrical leads that are removed to facilitate reconnecting them. Refer to the wiring diagram in figure 5.5 to resolve any wiring difficulties that may occur.

Warning: Always unplug the shredder to avoid possible severe electrical shocks before attempting to preform any repair.

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Motor does not run. No indication of power.	Power cord disconnected.	Connect power cord to outlet.
	Shred bag full.	Replace shred bag.
	Flap switch bad or misaligned.	Perform continuity check and replace or adjust flap switch as needed.
	Motor overheated.	Allow motor to cool.
	"ON" switch bad.	With "ON" switch depressed perform continuity tests across switch terminals #1 and #2, and #4 and #5. Replace "ON" switch if bad.
	Contactor bad.	Perform continuity tests and replace contactor if bad.

5.3 TROUBLESHOOTING GUIDE CHART (Continued)

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Motor does not run. No indication of power (Continued).	Printed circuit board bad.	With power to the unit and with the "ON" switch depressed check for +3 to 5 VDC at terminal #7. If incorrect voltage is present, make sure the board is receiving 115 VAC at terminals #1, #6, and #14. If AC voltages are correct and DC voltage is incorrect, replace printed circuit board.
	Solid state relay bad.	With "ON" switch depressed check for 3 to 5 volts DC flowing through relay terminals #3 and #4 and for 115 VAC at Terminals #2 and #1. Replace if bad.
Motor hums but does not run.	Cutting head jammed.	Clear jam.
	Contactor bad.	Perform continuity tests and replace contactor if bad.
	Start capacitor bad.	Replace capacitor if bad.
	Run capacitor bad.	Replace capacitor if bad.
	Motor bad.	Test and replace motor if bad.
Motor does not run in reverse.	"OFF/REV" switch bad.	Test for continuity across switch terminals #4 and #5 with switch depressed.

5.3 TROUBLESHOOTING GUIDE CHART (Continued)

SYMPTOM	PROBABLE CAUSE	CORRECTIVE ACTION
Motor does not run in reverse (Continued).	Contactor failing to return to home position.	Move any obstacle preventing proper operation.
	Contactor bad.	Make continuity checks and replace contactor if bad.
Motor does not automatically reverse during a jam.	Contactor not returning to home position.	Move any obstacle preventing proper operation.
	Contactor bad.	Make continuity tests and replace contactor if bad.
Motor continues to run in reverse after a jam.	Reverse switch bad.	Perform continuity test and replace switch if bad.
Shredding capacity is diminished.	Paper jammed in cutters.	Unjam cutters.
	Cutters out of adjustment.	Perform cutter shaft adjustment.
Only runs when switch is held down.	Bad control board.	Replace control board.
Motor cannot be stopped except by unplugging machine from wall outlet.	Bad solid state relay.	Test solid state relay. Replace if defective.