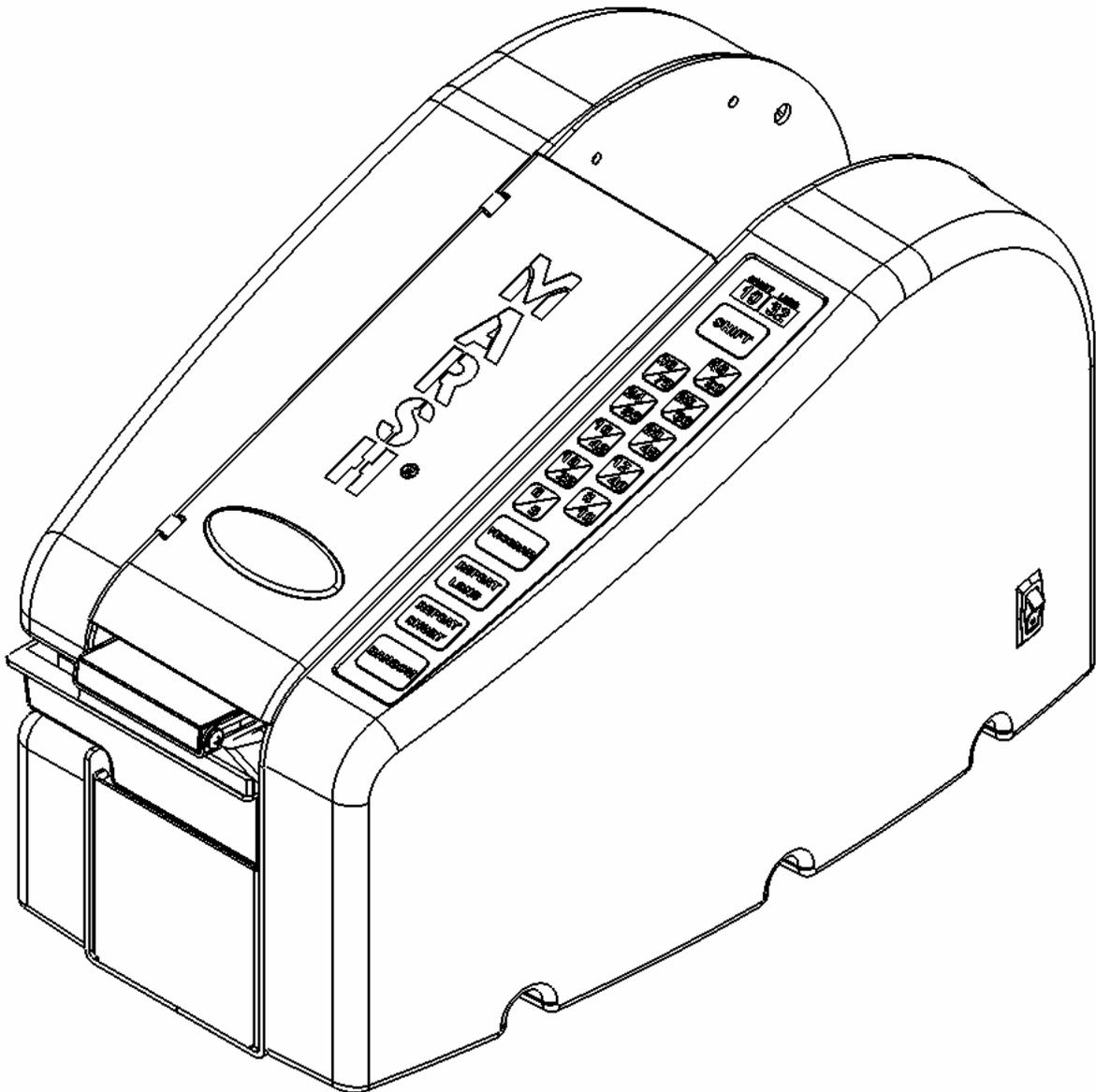


MARSH[®]

Marsh Shipping Supply Co. LLC

Marsh TD2100 Electric Taper
Technical Manual



A wall-socket must be close to the product and readily accessible.

The overall system is protected against overload by the branch circuit protection in accordance with the current edition of the NEC or CEC

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Introduction

*Congratulations on the purchase of your new **MARSH TD2100** gummed tape dispenser from MARSH SHIPPING SUPPLY CO., LLC. We are confident you will be very pleased with the operation and performance of this durable, quality built machine for many years to come.*

The TD2100 Electric Taper Technical Manual provides the necessary information about the operation, maintenance, and repair of your new tape dispenser. However, Marsh does have a policy of continual product improvement. So, Marsh reserves the right to modify the information contained within the manual without prior notice.

The setup section was designed to simplify the setup of the machine and allow you to get the machine up and running so that the machine can do what it is designed to do... dispense gummed tape quietly, quickly and accurately.

The operating section provides information on the operation of the machine, i.e. keystroke operation, programming repeat lengths, etc.

The maintenance section provides information about required care and maintenance of the machines and further adjustments if required for your particular use.

This technical manual provides a troubleshooting and repair sections to help you with possible operating problems and corrective actions. Should you require replacement parts, please refer to the provided parts list and the corresponding exploded view drawings.

For assistance, or if you would like to obtain information about any Marsh product, contact your Marsh distributor or Marsh Shipping Supply Company, LLC at:

Marsh Shipping Supply Company, LLC

*Address: 926 McDonough Lake Road
Collinsville, IL 62234 USA*

*Telephone: (618)-343-1006
Fax: (618)-343-1016
E-mail: quality.ovl@msscllc.com
Website: www.msscllc.com*

Technical Support

*Telephone: (573)-437-7030
Fax: (573)-437-4030*

Specifications

Net and Shipping Weight: 26 pounds (11.8 kg); 32 pounds (14.5 kg)

Water Bottle Capacity: 70 ounces (2070 ml)

Tape: Dry gummed tape – paper or reinforced – between 1 to 3 inches (25.4 to 76.2 mm) wide, up to 1000 feet (304.8 m) long and 9 (228.6 mm) inches max roll diameter

Electrical Requirements: 115 volts AC or 220 volts AC
50/60 Hz
4 amps at 115 volts
2 amps at 220 volts

Power Cord Length: 7 feet (2.3 m)

Dimensions:

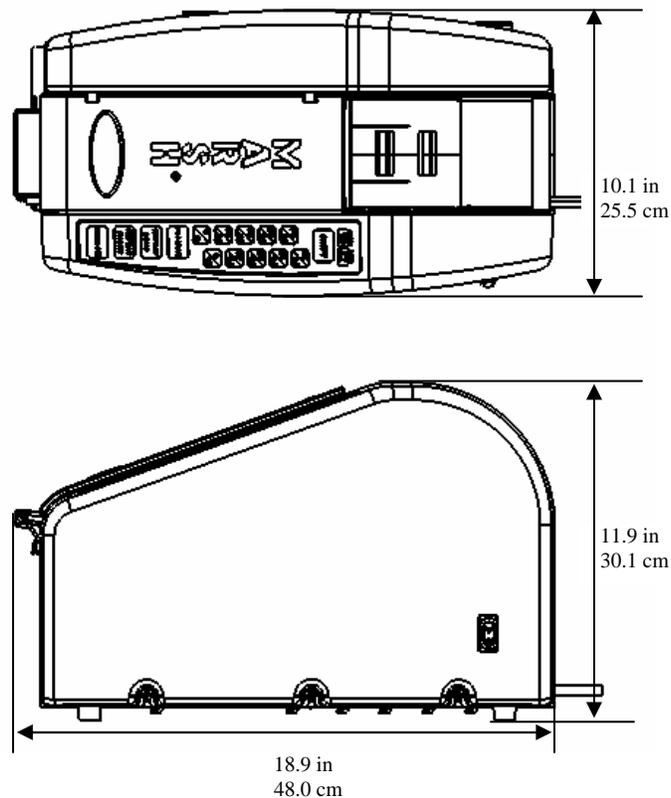


Figure 1 – Tape Machine Dimensions

Setup Instructions

Loading Tape – refer to **Figures 2 & 3**

1. Open the top cover of the machine.
2. Adjust the tape guides, with the tape guide turnbuckle, wide enough to get the tape between them.
3. Place the roll of tape into the machine.
4. Adjust the tape guides, with the tape guides turnbuckle, to hold the tape in the middle of the machine with a 1/8” clearance on both sides.
5. Remove the pressure plate from the machine.
6. Feed the tape, gummed side down, over the top roller, under the tape guide flaps, and then under the pinch roller, see Figure 3.

NOTE: For gummed side out tape (typically used in Europe), load the tape roll opposite as shown and route the gummed side over the top roller.

7. Place the pressure plate over the tape and release the pinch roller.
8. Close the top cover.

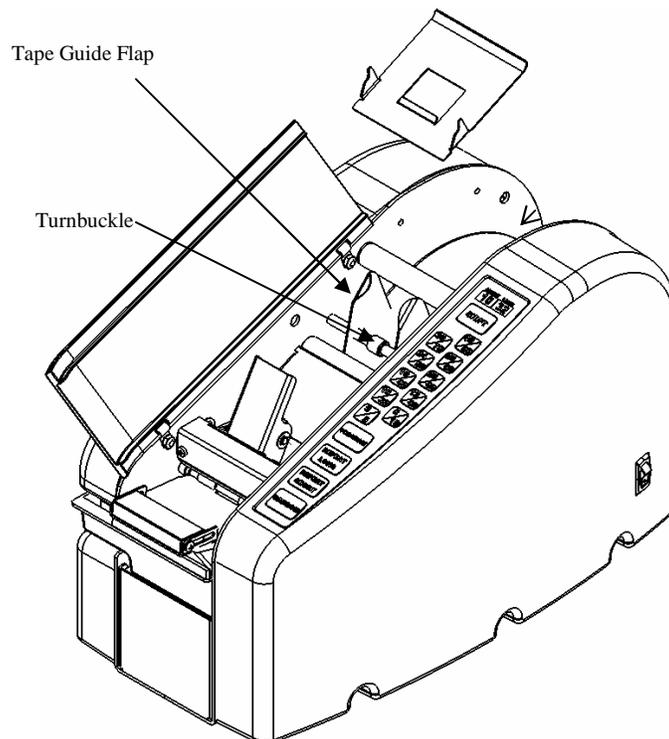


Figure 2 – Loading Tape

Figure 3 – Tape Routing

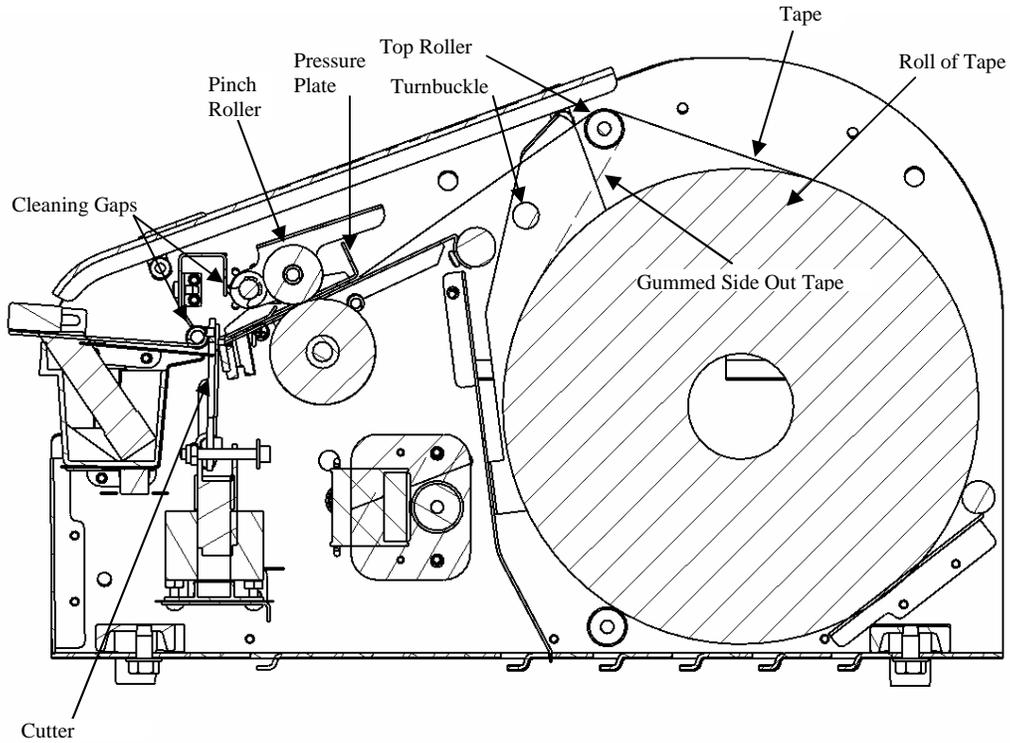
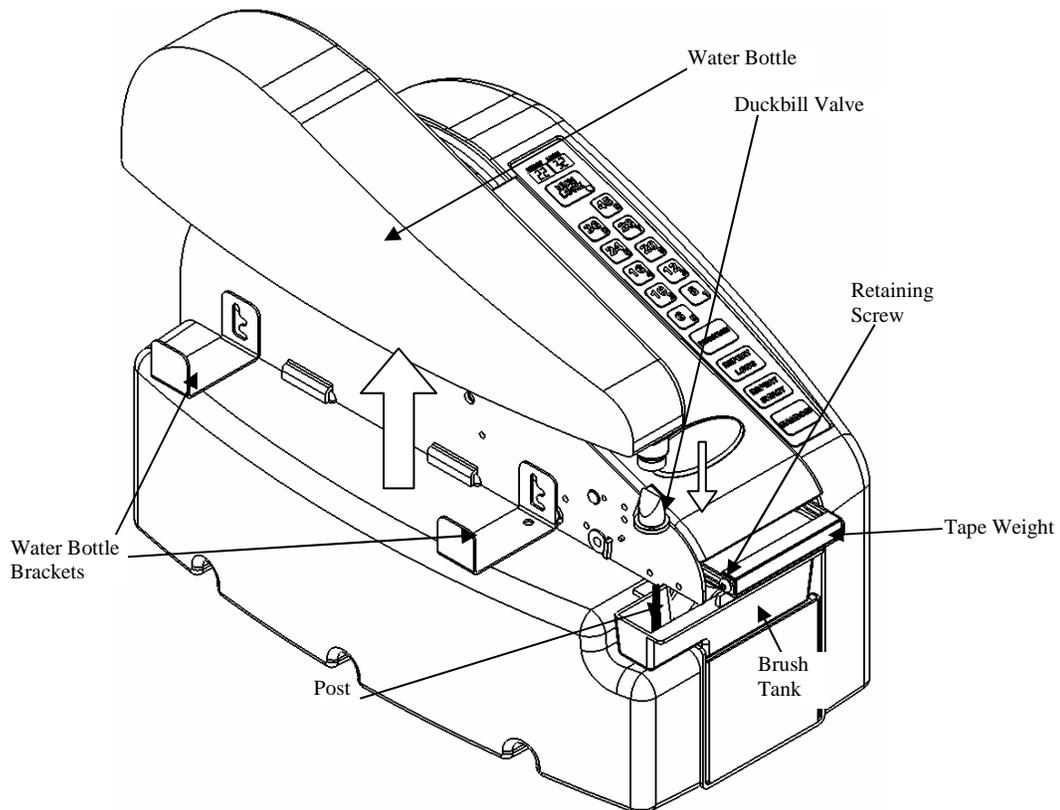


Figure 4 – Filling the Water Bottle, Adjusting the Brush Tank Water Level, Adjusting the Tape Weight



Filling the Water Bottle – Figure 4

1. Remove the water bottle from the machine.
2. Remove the duckbill valve from the water bottle.
3. Fill the water bottle with water.
4. Place the duckbill valve back into the water bottle.
5. Place the water bottle back onto the machine; verify that the post in the brush tank is inserted through the duckbill valve.

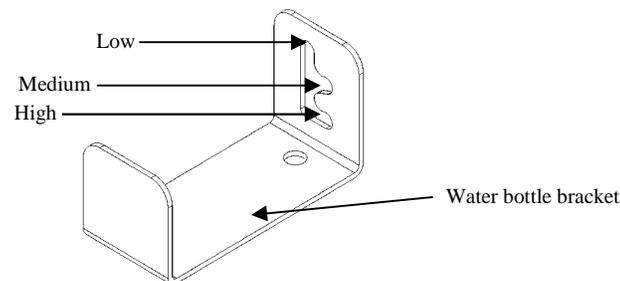


Figure 5 – Adjustable Water Level Positions

Adjusting the Brush Tank Water Level – refer to Figures 4 and 5

1. Loosen the retaining screws on the water bottle brackets.
2. Move the water bottle brackets to the desired position to obtain the desired water level in the brush tank, light weight tapes would typically be set at the low position, Figure 5.
3. Both brackets should be at the same position.
4. Tighten the retaining screws on the water bottle brackets.

Adjusting the Tape Weight – Figure 4

1. Loosen the retaining screw.
2. Slide the tape weight forward for greater pressure, typically heavy weight tapes which will apply more water on the tape.
3. Slide the tape weight backwards less pressure, typically light weight tapes which will apply less water on the tape.
4. Tighten the retaining screw.

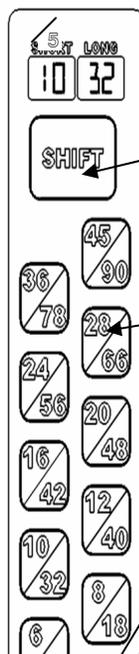
Operating Instructions

Standard Keypad

Pre-Programmed Lengths and SHIFT – There are 20 common lengths of tape pre-programmed into the memory of your TD2100 automatic tape dispenser. Simply press one of the ten length keys and the length in black is dispensed. To dispense the lengths in red press the **SHIFT** key then press the corresponding length key.

REPEAT SHORT and REPEAT LONG – It is possible to store any of the 20 pre-programmed lengths into the convenient REPEAT SHORT or REPEAT LONG keys. To do so, press **PROGRAM**, the desired length (red lengths require SHIFT key to be pressed first) and then the REPEAT SHORT or REPEAT LONG your preference. *While in PROGRAM MODE no tape is dispensed*, display flashes, and flashing stops when programming is completed or PROGRAM is pressed to cancel mode.

RANDOM – The RANDOM key allows the user to dispense tape while pressed and the machine will cut the tape when the RANDOM key is released.



Shift Key: When pressed followed by Number Key a red length is dispensed.

Number Keys: When pressed will dispense the length in black, after the shift key has been pressed will dispense the length in red.

Program Key: When pressed will activate the program sequence, display will flash, follow this by the desired length to be stored and the location to store it in.

Repeat Long Key: When pressed, this key will repeat the length that is stored in the long display. You will use this button during programming.

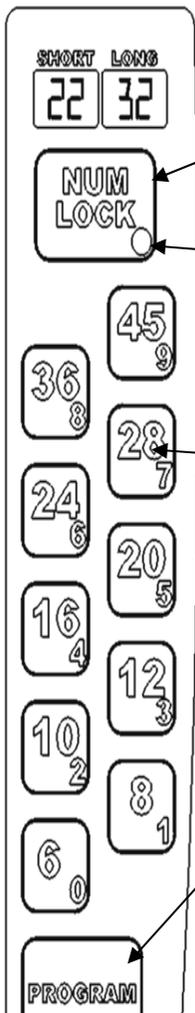
Repeat Short Key: When pressed, this key will repeat the length that is stored in the short display. You will use

TD2100 PREMIUM Keypad - The Premium keypad offers all the same function as the STANDARD keypad plus it is possible for you to dispense any length of tape from 5” to 99” in 1” increments. The exception from the STANDARD keypad is there are 10 preset lengths versus 20. There are two versions of the PREMIUM keypad, Short and Long. The Long version has longer pre-programmed lengths than the Short.

To dispense a length of tape 5” to 99” press the NUM LOCK key. The NUM LOCK light is lit and the 0-9 keys are activated. Just press any two keys to get the desired length. For example, press 07 for 7” piece of tape or 77 for a 77” piece of tape. These “custom” lengths can be programmed in the REPEAT SHORT or REPEAT LONG keys by turning on the NUM LOCK, press PROGRAM, press two keys of desired length and then desired REPEAT key to store value. **You must turn off the NUM LOCK mode to verify the length is stored and displayed.**

Num Lock Key: When pressed this key will activate the red number on the keypad.

Premium Short Keypad Num Lock Key Indicator: When lit, the NUM LOCK is activated and the red numbers are used. When not lit, the black numbers are used.



Number Keys: When pressed will dispense the length of tape in black, when num lock is on will give the red numbers for dispensing or programming, requires 2 key strokes for custom lengths.

Program Key: When pressed will begin the programming sequence, follow by pressing the desired length and the location to store it, press the num lock followed by the corresponding red numbers to achieve a custom length.

Repeat Long Key: When pressed, this key will repeat the length that is stored in the long display. You will use this button during programming.

Repeat Short Key: When pressed, this key will repeat the length that is stored in the short display. You will use this button during programming.

Random Key: When pressed will dispense tape until released.

TD2100 PREMIUM Keypad - The Premium keypad offers all the same function as the STANDARD keypad plus it is possible for you to dispense any length of tape from 5” to 99” in 1” increments. The exception from the STANDARD keypad is there are 10 preset lengths versus 20. There are two versions of the PREMIUM keypad, Short and Long. The Long version has longer pre-programmed lengths than the Short.

To dispense a length of tape 5” to 99” press the NUM LOCK key. The NUM LOCK light is lit and the 0-9 keys are activated. Just press any two keys to get the desired length. For example, press 07 for 7” piece of tape or 77 for a 77” piece of tape. These “custom” lengths can be programmed in the REPEAT SHORT or REPEAT LONG keys by turning on the NUM LOCK, press PROGRAM, press two keys of desired length and then desired REPEAT key to store value. **You must turn off the NUM LOCK mode to verify the length is stored and displayed.**

Premium Long Keypad

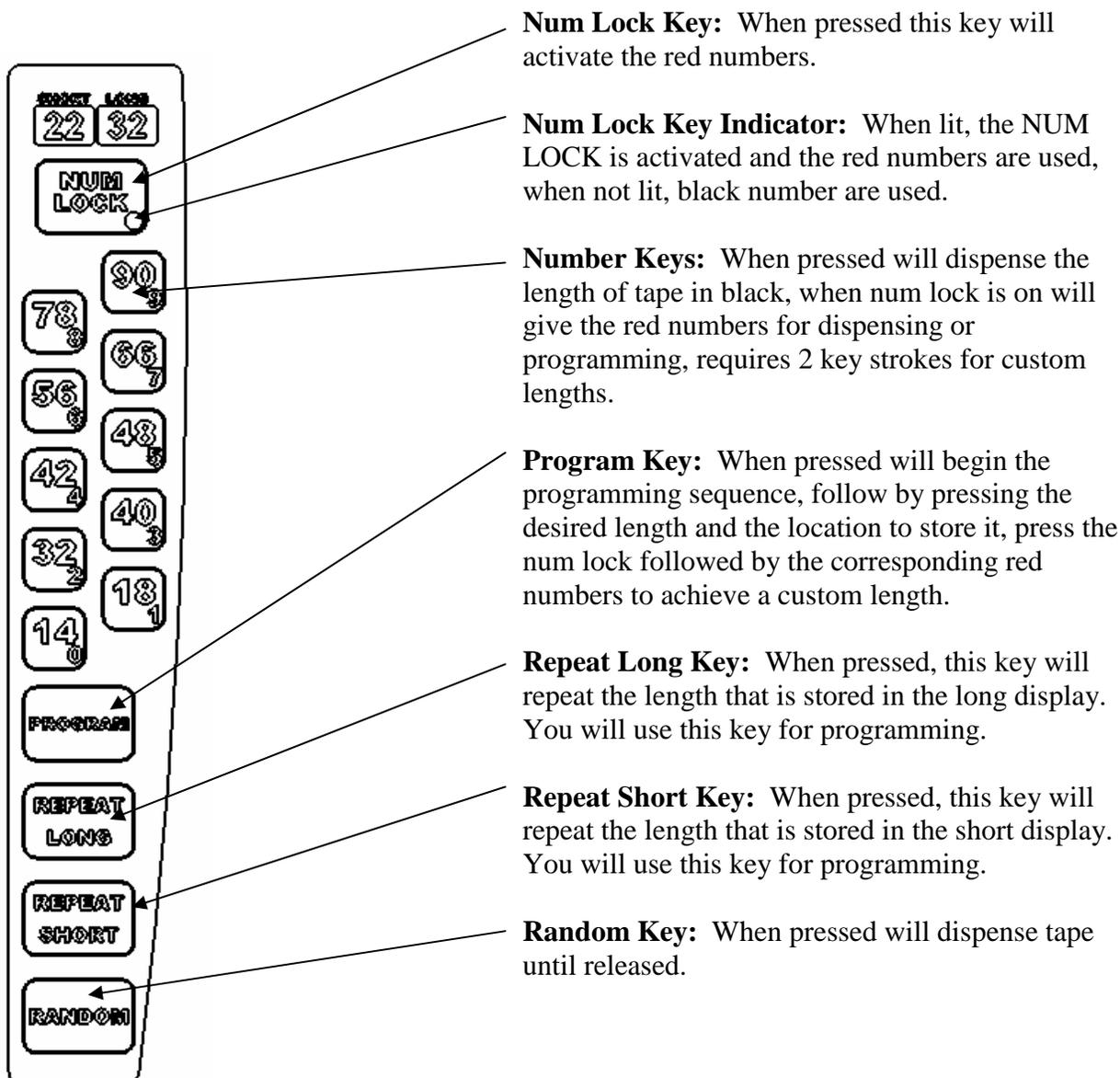


Figure 8 – Premium Long Keypad

Maintenance

The Marsh TD2100 requires very little maintenance, but it is important to regularly clean the brush, brush tank, cutter mechanism, and remove debris from the tape path.

CAUTION: Before beginning maintenance or adjustments be sure the tape machine is turned OFF and unplugged.

Cleaning Water Feed System

1. Turn the power switch to the OFF position and unplug the power cord.
2. Clean the brush by soaking it in warm soapy water and then rinse.
3. Clean the brush tank by rinsing it with warm water.
4. Rinse out the water bottle and duckbill valve with warm water.

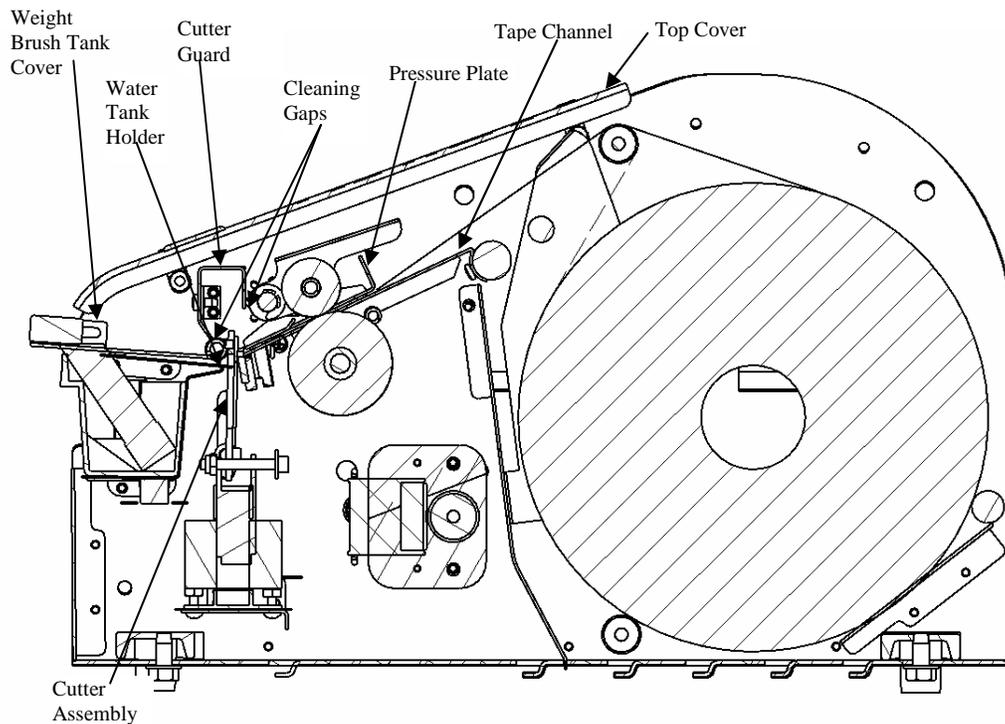


Figure 9 – Cleaning the Cutter Assembly, Cleaning the Tape Path

Cleaning the Cutter Assembly – Figure 9

1. Turn the power switch to the OFF position and unplug the power cord.
2. Open top cover.
3. Remove pressure plate.
4. Remove the tape from the tape path.
5. Using generous amount of a non-flammable lubricant (MG Chemicals Super Penetrating Lubricant [www.mgchemicals.com], is **recommended**), spray the cutter assembly behind the cutter guard, using the available gaps in front and behind the cutter guard. Allow the lubricant to dry or wipe dry.
6. Place the tape back in the tape path, refer to loading tape section.
7. Place the pressure plate back into the machine.
8. Close top cover.

Cleaning the Tape Path – Figure 9

1. Turn the power switch to the OFF position and unplug the power cord.
2. Open the top cover.
3. Remove pressure plate.
4. Remove tape from tape path.
5. Using compressed air remove all debris form the tape path.
6. Using a moist cloth wipe down all sheet metal parts within tape path (tape channel, pressure plate, weighted brush tank cover, and water tank holder) to remove debris and adhesive build-up.
7. Using compressed air remove any visible moisture from the tape path.
8. Referring to the tape loading section, place the tape back into the tape path.
9. Place the pressure plate back in the machine.
10. Close the top cover.

Troubleshooting

This section describes potential problems you may encounter while working with your TD2100 tape machine and outlines possible causes and solutions for these problems. To avoid problem situations, be sure to follow the procedures in the setup and maintenance sections. **Before performing any repair procedures be sure that the power switch is in the OFF position and the Tape Machine is disconnected from the power source.** For further assistance please contact your Marsh distributor or Marsh Shipping Supply Co. LLC technical support at;

Telephone: (573)-437-7030

Fax: (573)-437-4030

Email: quality.ovl@marshship.com

Problem: The machine will not feed the tape.

Possible Cause:

Solution:

- | | |
|---------------------------------------|---|
| 1. Is the path of the tape blocked? | 1. Clear all debris from the path of the tape. Ensure clearance at: <ol style="list-style-type: none"> a. the blades b. feed wheel Refer to Maintenance (p. 12) . |
| 2. Is the path of the tape dirty? | 2. Remove the pressure plate, wipe with a damp cloth whipe all debris out of the machine, then replace the pressure plate. Refer to Maintenance (p. 12) . |
| 3. Are the tape guides set correctly? | 3. Adjust the tape guide turnbuckle to ensure a 1/8" gap on each side of the tape. |
| 4. Is the tape routed correctly? | 4. Route the tape according to Fig 3 (p. 7). |
| 5. Is the feed wheel set screw loose? | 5. Make sure the feed wheel is in the correct position, and then tighten the feed wheel set screw (refer to Removing the Tape Channel Plate [p. 30] to gain access to the feed wheel set screw). |

Problem: The ON/OFF switch is not illuminated.*Possible Cause:*

1. Is the machine plugged in?
2. Is the switch turned to the ON position?
3. Is the switch properly connected?
4. Is the switch faulty?

Solution:

1. Plug the machine into an appropriate power source.
2. Turn the power switch to ON.
3. Connect the power cord wires and jumper wires 1 and 2 to the switch as shown in Fig 10 (p. 16).
4. Replace the power switch.

Problem: The motor doesn't run.*Possible Cause:*

1. Is the machine plugged in?
2. Is the machine turned on?
3. Is the switch properly connected?
4. Are the two 3 pin jumper plugs properly connected to the controller board?
5. Is the keypad plugged in?
6. Is the motor faulty?
7. Is the controller board faulty?

Solution:

1. Plug the machine into an appropriate power source.
2. Turn the switch to the ON position.
3. Connect the power cord wires and jumper wires 1 and 2 to the switch as shown in Fig 10 (p. 16).
4. The jumper cables shown in Fig 10 (p. 16) are jumper cable 1 and jumper cable 2 as shown. They should be attached to the controller board via the three pin connections labeled J1 and J2 respectively (shown in Fig 10).
5. Connect the keypad to the controller board.
6. Replace the motor. Refer to **Replacing the Motor (p. 62)**.
7. Replace the controller board. Refer to **Replacing the Controller Board (p. 45)**.

Fig 10

Encoder Connection – labeled PHOTO EYE on controller board. Connects the encoder to the controller board.

Jumper 1 – labeled J1 on controller board. Connects the switch to the controller board.

Jumper 2 – labeled J2 on controller board. Connects the switch to the controller board.

Heater Connection – labeled HEATER on controller board. Connects the heater to the controller board.

Ground Connection - Green in color. Connects the power cord to the chassis.

Power Cord - Connects the power supply to the switch.

Switch - Connects the power cord to the controller board and turns ON and OFF.

Motor Connection - labeled MOTOR on controller board. Connects the motor to the controller board.

Controller Board

Keypad Connection – labeled KEYPAD on controller board. Connects the keypad to the controller board.

Display Connection – labeled DISPLAY on controller board. Connects the display to the controller board.

Foot Switch Connection – labeled J8 on controller board. Connects the foot switch to the controller board.

Solenoid Connection – labeled SOL on controller board. Connects the solenoid to the controller board.

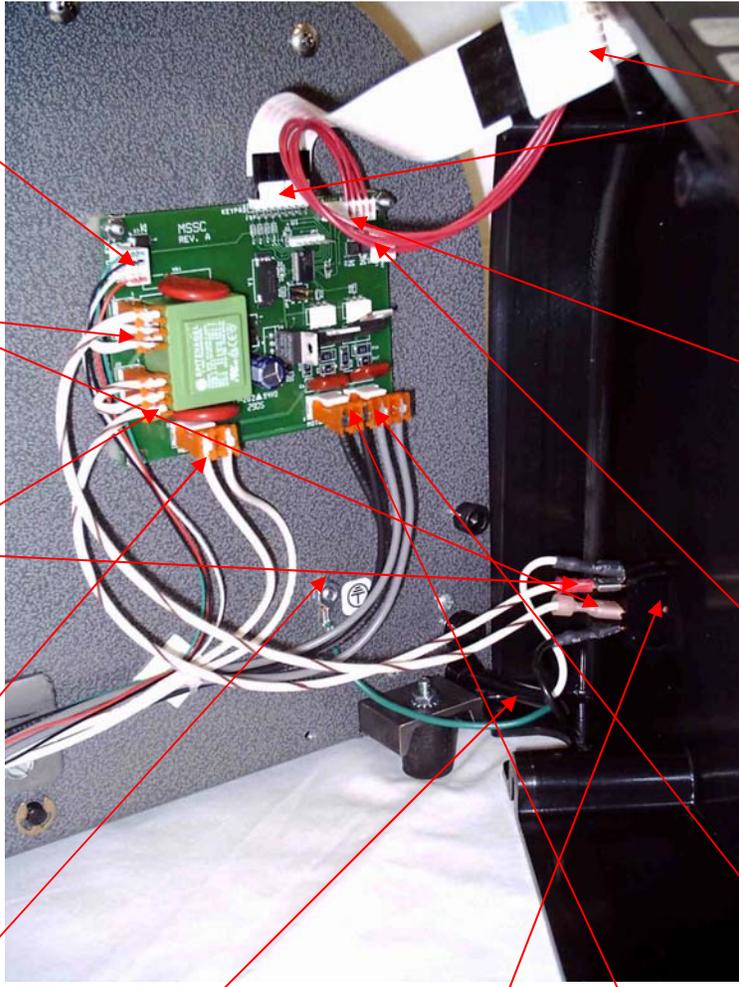
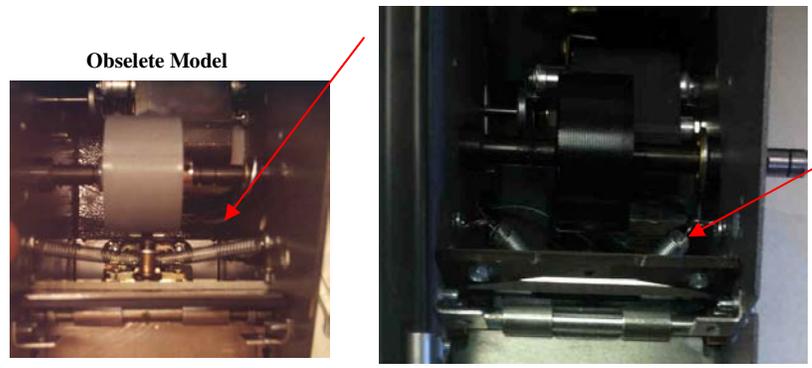


Fig 11



This is how the solenoid spring should look once the tape channel plate is removed (refer to **Removing the Tape Channel Plate [p. 34]**).

Problem: The machine doesn't operate when a key is pushed.

Possible Cause:

1. Is the machine plugged in?
2. Is the machine turned on?
3. Is the machine in program mode?
4. Is the ribbon cable plugged properly into the controller board assembly?
5. Are all connections properly mated?

Solution:

1. Plug the machine into an appropriate power source.
2. Turn the power switch to ON.
3. To turn the program mode off, press program key one time. If this does not work, turn the machine off and then turn the machine back on.
4. The ribbon cable should be plugged into the 8 pin connector labeled keypad on the controller board assembly.
5. Mate all connections properly according to Fig 10 (p. 16).

Problem: The tape slips at the feed wheel.

Possible Cause:

1. Is the feed wheel dirty?
2. Is the feed wheel set screw loose?

Solution:

1. Remove any tape from the machine.
2. Tighten the feed wheel set screw (refer to **Removing the Tape Channel Plate [p. 30]** to gain access to the feed wheel set screw).

Problem: The machine doesn't stop feeding the tape.*Possible Cause:*

1. Is the "continuous feed" activated?
2. Is the encoder plugged in?
3. Is the encoder adjusted correctly?
4. Is the solenoid spring in place?
5. Is the encoder faulty?

Solution:

1. Remove any obstacles that are pressing the RANDOM button down.
2. Plug the encoder 4-pin connector into the controller board at the 4-pin connection labeled PHOTO EYE (refer to Fig 10 [p. 16]).
3. Adjust the encoder. Refer to **Adjusting the Encoder (p. 47)**.
4. Ensure the springs are attached the spring hooks and are not broken. (refer to Fig 11 [p. 16]).
5. Replace the encoder. Refer to **Replacing the Encoder (p. 47)**.

Problem: The cutter doesn't cut the tape.*Possible Cause:*

1. Is the cutter clean?
2. Is the solenoid spring in place?
3. Are the blades of the cutter dull or worn?
4. Is the solenoid faulty?

Solution:

1. Clean the cutter blades. Refer to **Maintenance (p. 12)**.
2. Ensure the springs are attached the spring hooks and are not broken. (refer to Fig 11 [p. 16]).
3. Replace the cutters. Refer to **Replacing the Movable Cutter Blade (p. 45)** and/or **Replacing the Fixed Blade (p. 55)**.
4. Replace the solenoid. Refer to **Replacing the Solenoid (p. 60)**.

Problem: The tape is jamming or tearing.*Possible Cause:*

1. Is the pressure plate all the way to the pinch roll shaft?
2. Is the brush installed correctly?
3. Are the tape guides spaced correctly?

Solution:

1. Place the pressure plate all the way down to the pinch roll shaft.
2. Install the brush correctly. Refer to **Replacing the Brush (p. 49)**.
3. Adjust the tape guides to have a $\frac{1}{8}$ " gap on each side of the tape.

Problem: The tape is cut, but the cutter blades don't return to the neutral position*Possible Cause:*

1. Are the cutter blades clean?
2. Is the solenoid spring loose or improperly connected?
3. Is the solenoid spring broken?

Solution:

1. Clean the cutter blades. Refer to **Maintenance (p. 12)**.
2. Ensure that the spring is connected tightly between two screws going through the chassis with two nuts on the end (refer to Fig 11 [p. 16]).
3. Replace the solenoid spring. Refer to **Replace the Solenoid Return Spring (p. 52)**.

Problem: The tape is not the correct length.*Possible Cause:*

1. Is the tape consistently the wrong length?
2. Is the tape the wrong length inconsistently?

Solution: NOTE: Accuracy $\pm \frac{1}{2}$ "

1. The encoder needs to be adjusted. Refer to **Adjusting the Encoder (p. 47)**.
2. Clean the feed wheel. Check to see if the feed wheel is spinning on the feed wheel shaft. If the feed wheel is spinning on the feed wheel shaft, tighten the set screws on the feed wheel (refer to **Removing the Tape Channel Plate [p. 30]** to gain access to the feed wheel set screw). If that does not work, the controller board needs to be replaced. Refer to **Replacing the Controller Board (p. 45)**.

Problem: The tape doesn't stick to the carton.*Possible Cause:*

1. Is the water bottle full?
2. Is the brush clean?
3. Are the brush bristles worn?
4. Is there the correct amount of pressure on the tape?
5. Are the cartons dirty?
6. Is the water being heated?

Solution:

1. Fill the water bottle.
2. Clean the brush.
3. If the bristles do not extend above the top of the brush tank, the brush needs to be replaced.
4. Adjust the tape weight accordingly.
5. The tape may not stick properly on dirty cartons. Increase the water level.
6. See the trouble shooting section for **The heater doesn't heat (p. 21)**.

Problem: The tape slips on the carton.*Possible Cause:*

1. Is the tape too wet?
2. Are the cartons dirty?

Solution:

1. Adjust the water level and/or the tape weight.
2. The cartons need to be free of dust and dirt for proper adhesion.

Problem: The heater doesn't heat.*Possible Cause:*

1. Is the machine plugged in?
2. Is the machine turned on?
3. Is the thermostat securely attached?
4. Is the heater connected properly?
5. Are the wires connected to the heater?
6. Is the thermostat faulty?
7. Is the heater faulty?

Solution:

1. Plug the machine into an appropriate power source.
2. Turn the power switch to ON.
3. Tighten the screws holding the thermostat on (refer to **Replacing the Thermostat Assembly** and Fig 30 [p. 50]).
4. Connect all wires as shown in Fig 10 (p. 16).
5. You need to replace the heater assembly. Refer to **Attaching the Water Tank Holder (p. 38)**.
6. You may need to replace the thermostat assembly. Refer to **Replacing the Thermostat Assembly (p. 49)**.
7. You may need to replace the heater assembly. Refer to **Removing the Water Tank Holder and Attaching the Water Tank Holder (p. 38)**.

Problem: The display shows all 8's or all dashes.*Possible Cause:*

1. Is the display cable connected correctly?
2. Is the machine in program mode?

Solution:

1. Mate the display cable securely to the controller board and to the display board with one twist in the cable (refer to Fig 10 [p. 16]).
2. Press program to exit program mode or program the machine. Refer to **Operating Instructions (p. 9)**.

Repair

For any Repairs

To attempt any repairs, the foot channels should be loosened (Fig 12). This allows the chassis to “relax.” If the foot channels are not loosened, taking apart the machine will be difficult and may not reassemble correctly.

For any Repairs involving Aluminum Sheet Metal

When attempting any repairs involving steel sheet metal pieces, do not over tighten the screws. The screws are to keep the part in place not to provide structural support. The screws should be **snug, not tight**.

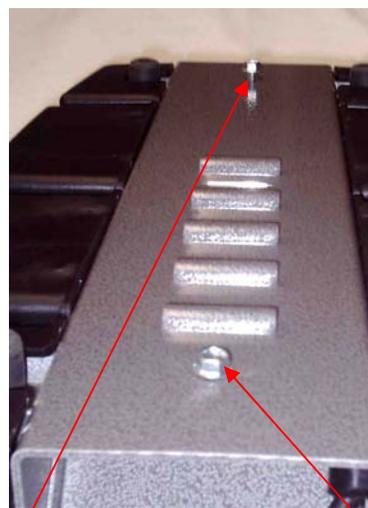
Tools for Repair

When attempting any repairs to the TD 2100, certain tools make the disassembly and reassembly of the TD 2100 easier (Fig 13). Below is a list of the tools that are recommended for the disassembly and assembly of the TD 2100.

- $\frac{3}{8}$ " flat head screw driver
- #2 4" Phillips head screw driver
- #2 8" Phillips head screw driver
- Needle nose pliers.
- $\frac{1}{4}$ " wrench or socket
- $\frac{11}{32}$ " wrench or socket
- $\frac{3}{8}$ " wrench or socket
- $\frac{1}{2}$ " wrench or socket
- $\frac{3}{32}$ " long hex key
- $\frac{5}{64}$ " hex key
- $\frac{1}{16}$ " hex key
- $\frac{5}{32}$ " hex key



Fig 12



Loosen both screws on the bottom of the chassis.

Fig 13

Removing the Right Side Cover

To remove the right side cover, see Fig 14 and follow the steps below.

1. Turn the switch to OFF and unplug the machine.
2. Remove the water bottle and duckbill valve.
3. Remove water tank and brush.
4. Open top cover.
5. Remove the three screws along the inside of the machine.
6. Remove the three screws along the outside of the machine.
7. Slowly pull the right side cover away from the chassis.

CAUTION: There are many wire connections made between the chassis and the right side cover. Do not damage these connections.

*NOTE: To do many repairs or maintenance this is as far as needed to proceed with the removal of the right side cover. To reattach the right side cover from this point, refer to step 4 of **Attaching the Right Side Cover**.*

8. Remove the two ribbon cable connecting the display and the key pad from the board.
9. Remove the power wires from the ON/OFF switch, noting the color and connection configuration.

The right side cover is now completely removed from the chassis. At this point a new right side cover may be installed.

Attaching the Right Side Cover

To attach the right side cover, see Fig 14 and follow the steps below.

1. Bring the right side cover close enough to attach the power wires to the switch.
2. Attach the power wires.
3. Attach connections to the controller board.
4. Attach the three screws along the outside of the machine.
5. Attach the three screws along the inside of the machine.
6. Close the top cover.
7. Place the water tank and brush into the water tank holder.
8. Place the water bottle and duckbill valve onto the water bottle brackets with the post of the water tank into the duckbill valve.

The machine is now ready to continue normal operation.

Fig 14 Right Side Cover

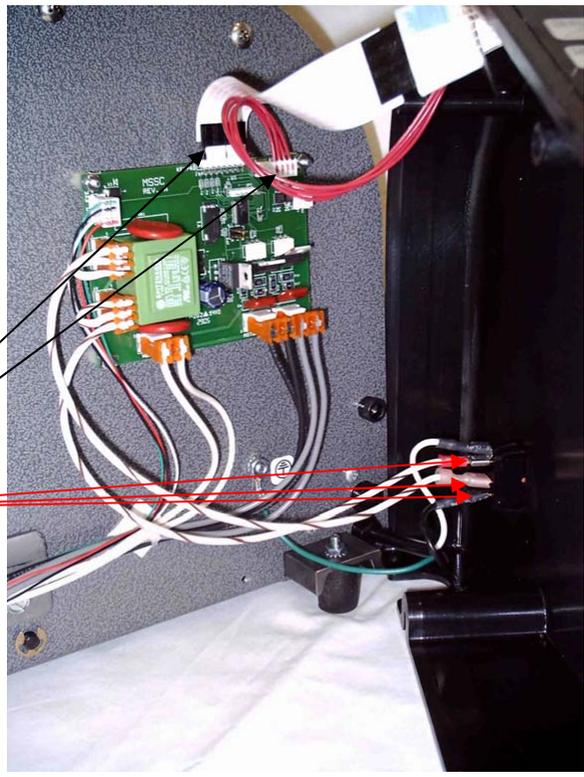
5. Remove the three screws along the inside of the machine.



6. Remove the three screws along the outside of the machine.

*NOTE: To do many repairs or maintenance this is as far as needed to proceed with the removal of the right side cover. To reattach the right side cover from this point, refer to step 4 of **Attaching the Right Side***

8. Remove the two ribbon cable connecting the display and the key pad from the controller board.
9. Remove the power wires from the switch



Removing the Left Side Cover

To remove the left side cover, see Fig 15 and follow the steps below.

1. Remove the water bottle and duckbill valve.
2. Remove water tank and brush.
3. Remove the three screws along the bottom edge of the left side cover.
4. Slide the left side cover towards the bottom of the machine and pull the left side cover away.

The left side cover is now removed. At this point a new left side cover may be installed.

Attaching the Left Side Cover

To attach the left side cover, see Fig 15 and follow the steps below.

1. Place the left side cover on the chassis aligning the tabs in the left side cover with the corresponding tabs on the chassis.
2. Slide the left side cover towards the top of the machine.
3. Screw the three screws along the bottom edge of the left side cover into the chassis.
4. Place the water tank and brush into the water tank holder.
5. Place the water bottle and duckbill valve onto the water bottle brackets with the post of the water tank into the duckbill valve.

The left side cover is now attached.

Fig 15 Left Side Cover

4. Remove the three screws along the bottom edge of the left side cover.



4. Slide the left side cover towards the bottom of the machine and pull the left side cover away.

Removing the Timing Belt

To remove the timing belt, see Fig 16 and follow the steps below.

1. Turn the switch to OFF and unplug the machine.
2. Remove the right side cover (refer to **Removing the Right Side Cover [p. 23]**).
3. Facing the right side of the machine, remove the timing belt from the large timing pulley first, then from the small timing pulley.

The timing belt is now removed from the machine. At this point a new timing belt may be installed.

Attaching the Timing Belt

To attach the timing belt, see Fig 16 and follow the steps below.

1. Place the timing belt on the small timing pulley first, lining the teeth in the timing belt with the teeth of the small timing pulley.
2. Slightly stretch the timing belt around the large timing pulley, lining the teeth in the timing belt with the teeth of the large timing pulley.
3. Attach the right side cover (refer to **Attaching the Right Side Cover [p. 23]**).

The machine is now ready to continue normal operation.

Fig 16 Timing Belt



3. Facing the right side of the machine, remove the timing belt from the large timing pulley first, then from the small timing pulley.

Removing the Small Timing Pulley

To remove the small timing pulley, see Fig 17 and follow the steps below.

1. Turn the switch to OFF and unplug the machine.
2. Remove the right side cover (refer to **Removing the Right Side Cover [p. 23]**).
3. Remove the belt (refer to **Removing the Timing Belt [p. 27]**).
4. Remove the set screw in the small timing pulley.
5. Remove the small timing pulley from the shaft of the motor.

The small timing pulley is now removed. At this point, a new small timing pulley may be installed.

Attaching the Small Timing Pulley

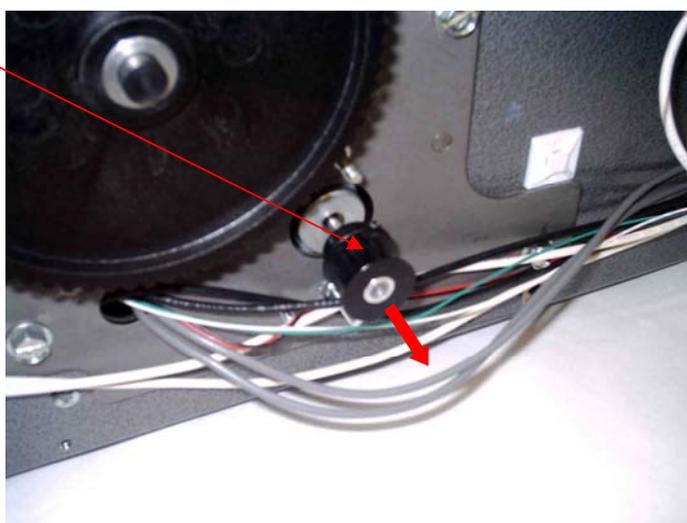
To attach the small timing pulley, see Fig 17 and follow the steps below.

1. Push the small timing pulley onto the shaft of the motor.
2. Insert the set screw into the small timing pulley and tighten the set screw down on the flat surface on the shaft of the motor.
3. Attach the timing belt (refer to **Attaching the Timing Belt [p. 27]**).
4. Attach the right side cover (refer to **Attaching the Right Side Cover [p. 23]**).

The machine is now ready to continue normal operation.

Fig 17 Small Timing Pulley

5. Remove the small timing pulley from the shaft of the motor.



Removing the Large Timing Pulley

To remove the large timing pulley, see Fig 18 and follow the steps below.

1. Turn the switch to OFF and unplug the machine.
2. Remove the right side cover (refer to **Removing the Right Side Cover [p. 23]**).
3. Remove the belt (refer to **Removing the Timing Belt [p. 27]**).
4. Remove the set screw in the large timing pulley.
5. Remove the large timing pulley from the feed wheel shaft.

The large timing pulley is now removed. At this point, a new large timing pulley may be installed.

Attaching the Large Timing Pulley

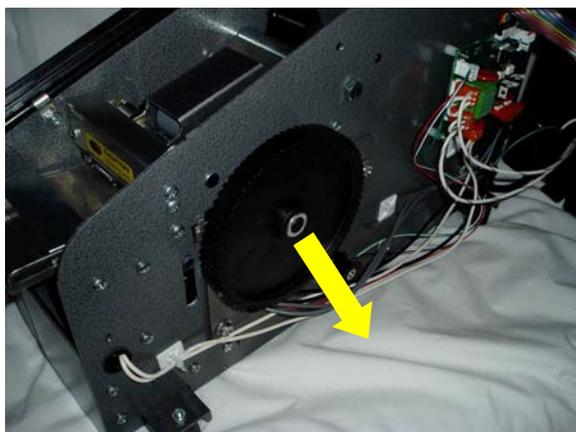
To attach the large timing pulley, see Fig 18 and follow the steps below.

NOTE: Make sure that any washers that were on the feed wheel shaft are now placed back on the feed wheel shaft.

1. Push the large timing pulley onto the feed wheel shaft.
2. Insert the set screw into the large timing pulley and tighten the set screw down on the flat surface of the feed wheel shaft.
3. Attach the timing belt (refer to **Attaching the Timing Belt [p. 27]**).
4. Attach the right side cover (refer to **Attaching the Right Side Cover [p. 23]**).

The machine is now ready to continue normal operation.

Fig 18 Large Timing Pulley



5. Remove the large timing pulley from the feed wheel shaft.



NOTE: Make sure that any washers that were on the feed wheel shaft are now placed back on the feed wheel shaft.

Removing the Pinch Roller

To remove the pinch roller, see Fig 13 and follow the steps below according to the serial number of the machine.

For serial numbers 601081 and below:

1. Remove the water bottle.
2. Remove the pressure plate.
3. Facing the front of the machine, pull the pinch roller spring towards the front and to the left of the machine until the spring is no longer on the pinch roller.
4. Release the pinch roller spring gently.
5. Remove the four $\frac{3}{8}$ " e-clips from the pinch roller shaft.

CAUTION: Do not let the e-clips fall into the machine.

6. With one hand holding the pinch roller and the pinch roller spring, slide the pinch roller shaft to the left until the pinch roller shaft is no longer on the chassis.

For serial numbers 601082 and above:

1. Remove the water bottle.
2. Remove the pressure plate.
3. Facing the front of the machine, pull the pinch roller springs towards the front and to the left and right of the machine until the springs are no longer on the pinch roller.
4. Release the pinch roller spring gently.
5. Remove the four $\frac{3}{8}$ " e-clips from the pinch roller shaft.

CAUTION: Do not let the e-clips fall into the machine.

6. With one hand holding the pinch roller and the pinch roller spring, slide the pinch roller shaft to the left until the pinch roller shaft is no longer on the chassis.

The pinch roller is now removed. At this point a new pinch roller may be installed.

Attaching the Pinch Roller

To attach the pinch roller, see Fig 19 and follow the steps below.

1. Put the pinch roller shaft into the chassis from the left side of the machine.
2. *NOTE: Only go approximately $\frac{1}{4}$ of the way into the chassis.*
3. Put the first pinch roller spring through the chassis and then on the shaft.
4. Put the pinch roller on the pinch roller shaft.
5. Put the second pinch roller spring through the chassis and then on the shaft.
6. Attach the four $\frac{3}{8}$ " e-clips onto the pinch roller shaft.
7. Pull the pinch roller springs towards the front and towards the pinch roller until the springs are over the pinch roller.
8. Release the pinch roller spring gently.
9. Place pressure plate underneath the pinch roller.
10. Attach the water bottle.

The machine is now ready to continue normal operation.

Fig 19 Pinch Roller, Serial Numbers 601081 and Below

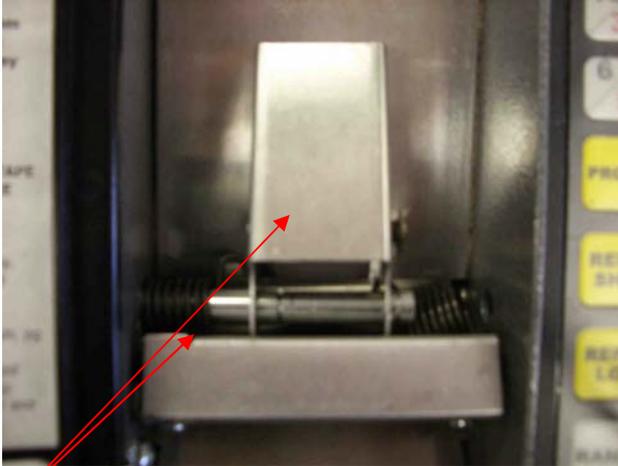


2. Remove the pressure plate.



3. Facing the front of the machine, pull each of the pinch roller springs towards the front and to the side of the machine until the springs are no longer on the pinch roller.

4. Release the pinch roller spring gently.



6. With one hand holding the pinch roller and the pinch roller spring, slide the pinch roller shaft to the left till the pinch roller shaft is no longer on the chassis.



Fig 13 Pinch Roller, Serial Numbers 601082 and Above



2. Remove the pressure plate.

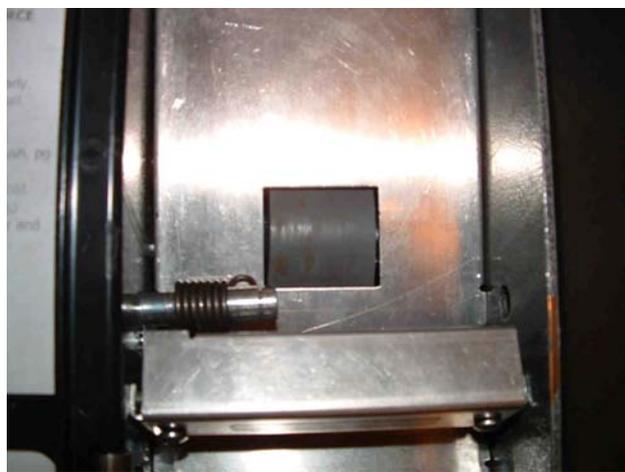


3. Facing the front of the machine, pull the pinch roller springs towards the front and to the left and right of the machine until the springs are no longer on the pinch roller.

4. Release the pinch roller spring gently.



6. With one hand holding the pinch roller and the pinch roller spring, slide the pinch roller shaft to the left until the pinch roller shaft is no longer on the chassis.



4. With the left end of the pinch roller spring on top of the screw on the left side of the machine, slide the pinch roller shaft into the right side of the chassis.

Removing the Weighted Brush Cover

To remove the weighted brush cover, see Fig 20 and follow the steps below.

1. Turn the switch to OFF and unplug the machine.
2. Remove the right side cover (refer to **Removing the Right Side Cover [p. 23]**).
3. Remove the water bottle.
4. Remove the cutter guard.
5. Remove the screws from the flapper shaft.
6. Slide the flapper shaft, weighted brush cover, tape weight, and bushings from the front of the machine.
7. Remove the screw from the tape weight and remove the tape weight from the weighted brush cover.

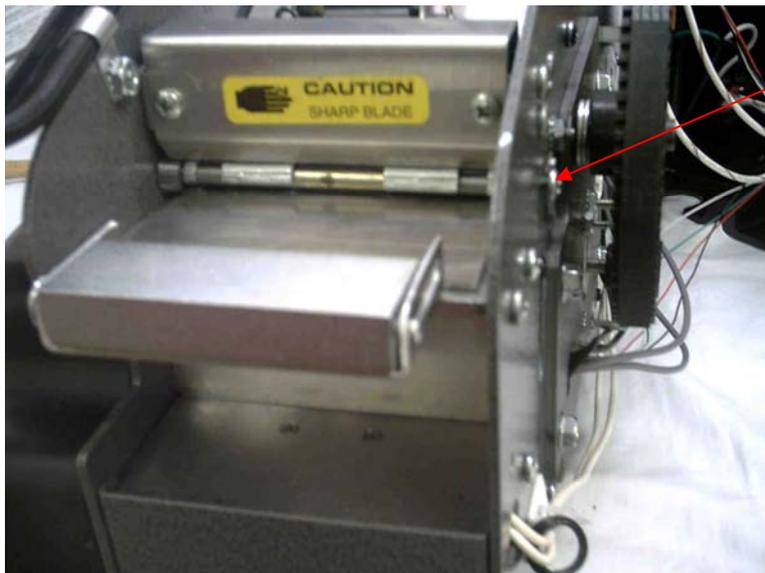
The weighted brush cover is now removed from the machine. At this point a new weighted brush cover or tape weight may be installed.

Attaching the Weighted Brush Cover

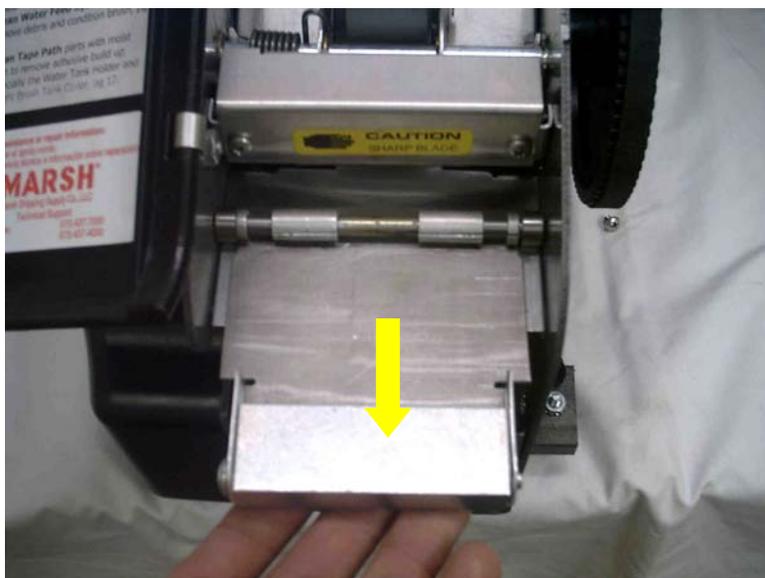
To attach the weighted brush cover, see Fig 20 and follow the steps below.

1. Position the tape weight into the new weighted brush cover and screw in the screw.
2. Slide one end of the flapper shaft into to the chassis.
3. Place a bushing, then the weighted brush cover, then another bushing on the flapper shaft and slide the rod through the other side of the chassis.
4. Attach the screws to the flapper shaft.
5. Attach the cutter guard.
6. Attach the water bottle.
7. Attach the right side cover (refer to **Attaching the Right Side Cover [p. 23]**).

The machine is now ready to continue normal operations

Fig 20 Weighted Brush Cover

5. Remove the screws from the flapper shaft.



6. Slide the flapper shaft, weighted brush cover, tape weight, and bushings from the front of the machine.

Removing the Tape Channel Plate

To remove the tape channel plate, see Fig 21 and follow the steps below.

1. Turn the switch to OFF and unplug the machine.
2. Remove the right side cover (refer to **Removing the Right Side Cover [p. 23]**).
3. Remove the pinch roller (refer to **Removing the Pinch Roller [p. 30]**).
4. Remove the timing belt (refer to **Removing the Timing Belt [p. 27]**).
5. Remove the large timing pulley (refer to **Removing the Large Timing Pulley [p. 29]**).
6. Remove the weighted brush cover (refer to **Removing the Weighted Brush Cover [p. 32]**).
7. Loosen the dead roller and the coder bar screws.
8. Remove the pinch roller spring stop.
9. Remove the two screws attached to the tape channel plate.
10. Push down on the movable cutter assembly, then pull up on the tape channel plate so that the tape channel plate and the dead roller rotate so that the screws underneath are accessible.
11. Remove the two screws connecting the tape channel plate and the dead roller.

The tape channel plate is now removed. At this point, a new tape channel plate may be installed.

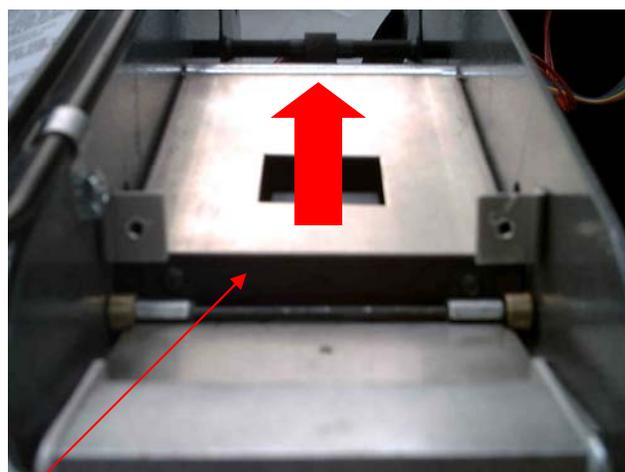
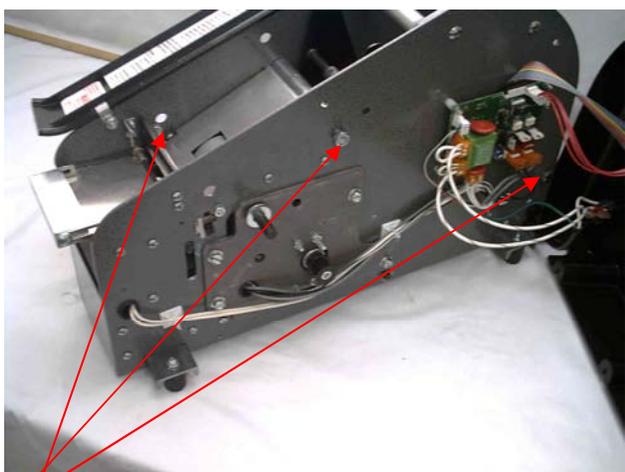
Attaching the Tape Channel Plate

To attach the tape channel plate, see Fig 21 and follow the steps below.

1. Place the tape channel plate so that the screw holes on the tape channel plate and the dead roller line up.
2. Attach the tape channel plate to the dead roller with two screws.
3. Push down on the tape channel plate till the holes in the chassis line up with the holes in the tape channel plate.
4. Attach the tape channel plate to the chassis with two screws.
5. Attach the pinch roller spring stop.
6. Tighten the dead roller and coder bar screws.
7. Attach the weighted brush cover (refer to **Attaching the Weighted Brush Cover [p. 32]**).
8. Attach the large timing pulley (refer to **Attaching the Large Timing Pulley [p. 29]**).
9. Attach the timing belt (refer to **Attaching the Timing Belt [p. 27]**).
10. Attach the pinch roller (refer to **Attaching the Pinch Roller [p. 30]**).
11. Attach the right side cover (refer to **Attaching the Right Side Cover [p. 23]**).

The machine is now ready to continue normal operation.

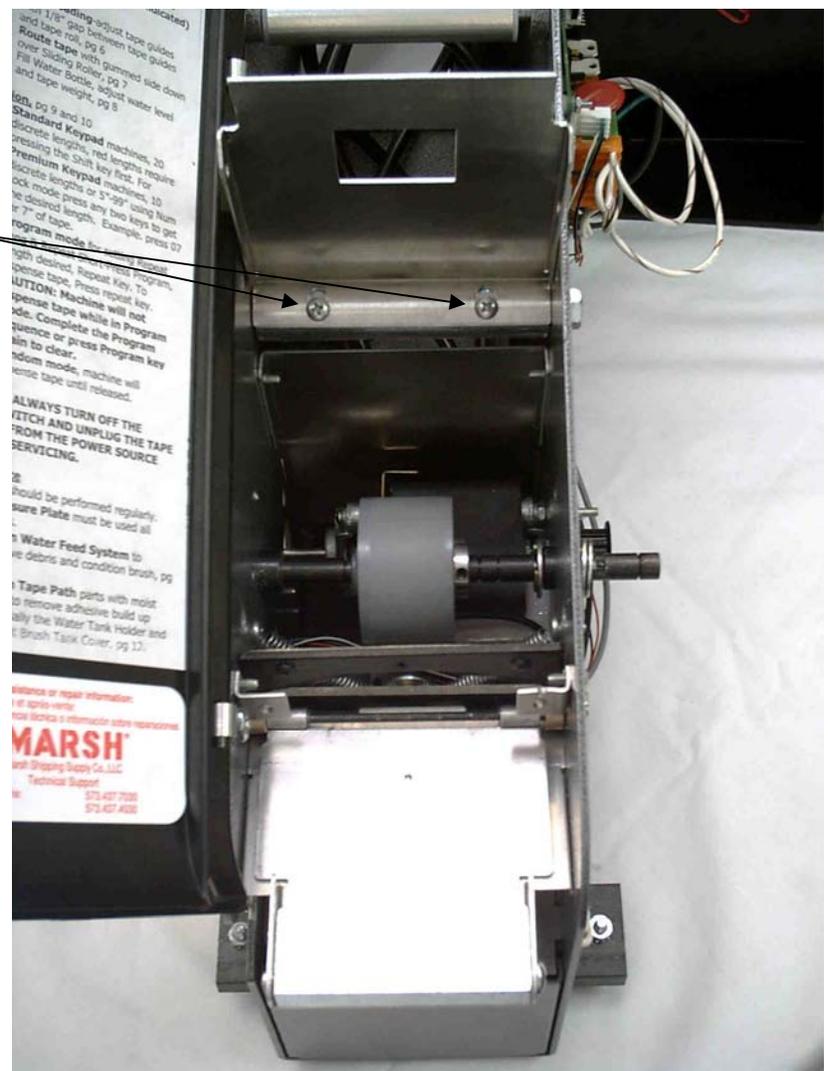
Fig 21 Tape Channel Plate



- 7. Loosen the dead roller and the coder bar screws.
- 8. Remove the pinch roller spring stop.

- 10. Push down on the movable cutter assembly, then pull up on the tape channel plate so that the tape channel plate and the dead roller rotate so that the screws underneath

- 11. Remove the two screws connecting the tape channel plate and the dead roller.



Removing the Tape Basket/Motor Cover

To remove the tape basket/motor cover, see Fig 22 and follow the steps below.

1. Turn the switch to OFF and unplug the machine.
2. Remove the right side cover (refer to **Removing the Right Side Cover [p. 23]**).
3. Remove the left side cover (refer to **Removing the Left Side Cover [p. 25]**).
4. Remove the pinch roller (refer to **Removing the Pinch Roller [p. 30]**).
5. Remove the timing belt (refer to **Removing the Timing Belt [p. 27]**).
6. Remove the large timing pulley (refer to **Removing the Large Timing Pulley [p. 29]**).
7. Remove the weighted brush cover (refer to **Removing the Weighted Brush Cover [p. 32]**).
8. Remove the tape channel plate (refer to **Removing the Tape Channel Plate [p. 34]**).
9. Remove the two screws holding the tape basket/motor cover.
10. Remove the tape basket/motor cover by lifting straight up parallel with the angle that the tape basket/motor cover makes.

The large tape basket/motor cover is now removed. At this point, a new tape basket/motor cover may be installed.

Attaching the Tape Basket/Motor Cover

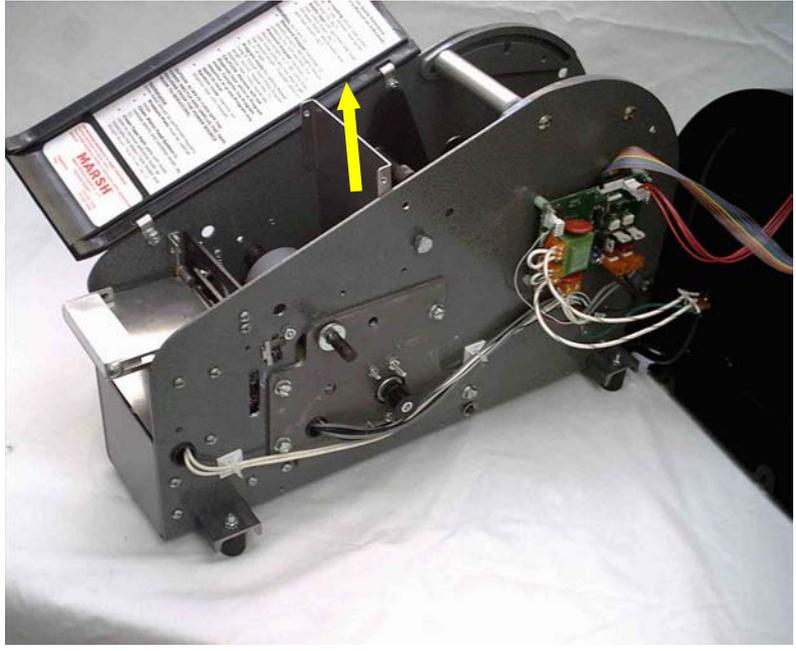
To attach the tape basket/motor cover, see Fig 22 and follow the steps below.

1. Insert the tape basket/motor cover into the machine going straight through the top and middle of the machine.
2. Attach the tape basket/motor cover with two screws.
3. Attach the tape channel plate (refer to **Attaching the Tape Channel Plate [p. 34]**).
4. Attach the weighted brush cover (refer to **Attaching the Weighted Brush Cover [p. 32]**).
5. Attach the large timing pulley (refer to **Attaching the Large Timing Pulley [p. 29]**).
6. Attach the timing belt (refer to **Attaching the Timing Belt [p. 27]**).
7. Attach the pinch roller (refer to **Attaching the Pinch Roller [p. 30]**).
8. Attach the left side cover (refer to **Attaching the Left Side Cover [p. 25]**).
9. Attach the right side cover (refer to **Attaching the Right Side Cover [p. 23]**).

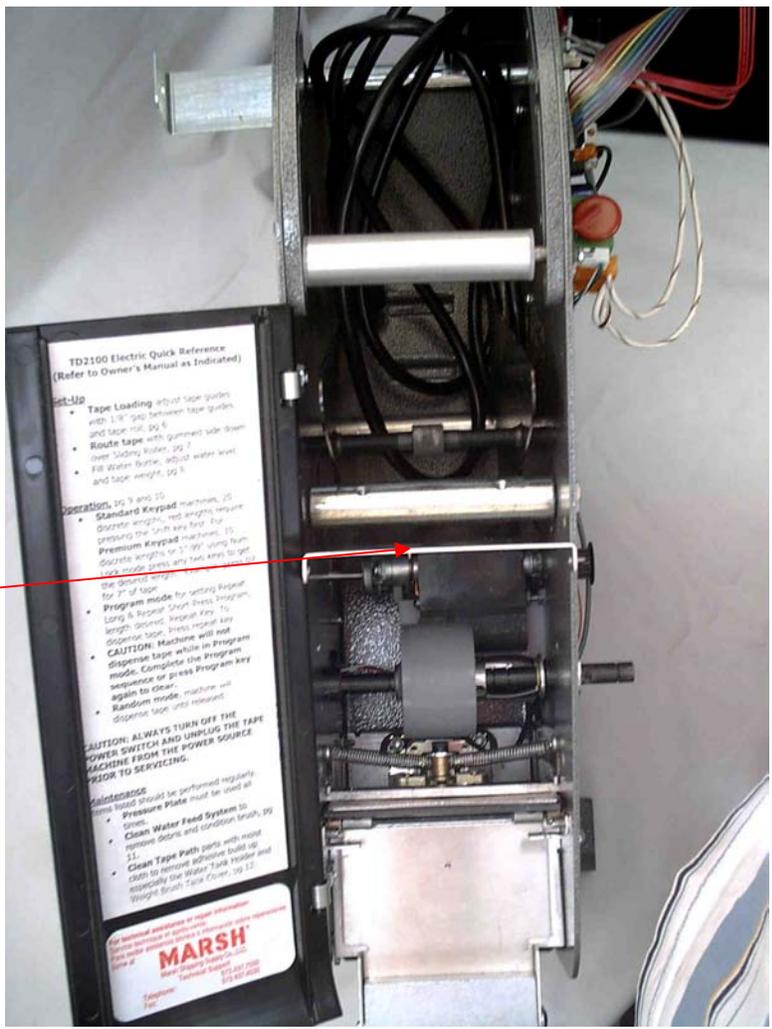
The machine is now ready to continue normal operation.

Fig 22 Tape Basket/Motor Cover

10. Remove the tape basket/motor cover by lifting straight up parallel with the angle that the tape basket/motor cover makes.



1. Insert the tape basket/motor cover into the machine going straight through the top and middle of the machine.



Removing the Water Tank Holder

To remove the water tank holder, see Fig 23 and follow the steps below.

1. Turn the switch to OFF and unplug the machine.
2. Remove the right side cover (refer to **Removing the Right Side Cover [p. 23]**).
3. Remove the left side cover (refer to **Removing the Left Side Cover [p. 25]**).
4. Loosen the screws in the coder bar and dead roller.
5. Remove the four screws from the front cover.
6. Remove the front cover.
7. Remove the seven screws from the water tank holder.
8. Remove the water tank holder.

The water tank holder is now removed. At this point, a new water tank holder may be installed.

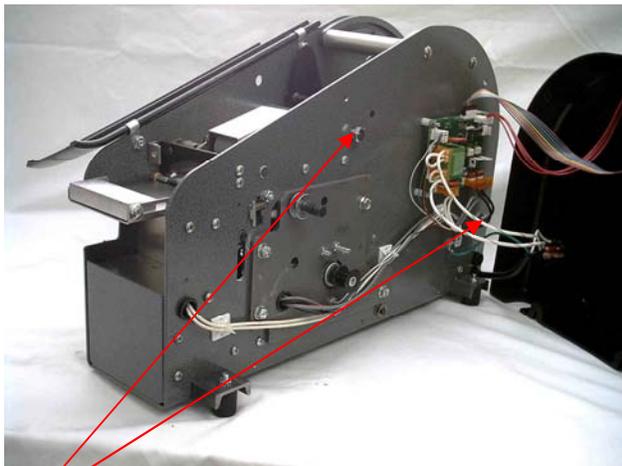
Attaching the Water Tank Holder

To attach the water tank holder, see Fig 23 and follow the steps below.

1. With one hand pushing the chassis slightly apart, position the water tank holder.
2. Loosely attach the water tank holder with the seven screws.
3. With one hand pushing the chassis slightly apart, position the front cover.
4. Attach the screws to the front cover.
5. Tighten the screws in the coder bar, dead roller, and water tank holder. Attach the left side cover (refer to **Attaching the Left Side Cover [p. 25]**).
6. Attach the right side cover (refer to **Attaching the Right Side Cover [p. 23]**).

The machine is now ready to continue normal operation.

Fig 23 Water Tank Holder



5. Loosen the screws in the coder bar and dead roller.

6. Remove the front cover.



9. Remove the water tank holder.

Removing the Movable Cutter Assembly

To replace the movable cutter assembly, see Fig 24 and follow the steps below.

1. Turn the switch to OFF and unplug the machine.
2. **Removing the Right Side Cover [p. 23]**.
3. Remove the left side cover (refer to **Removing the Left Side Cover [p. 25]**).
4. Remove the pinch roller (refer to **Removing the Pinch Roller [p. 30]**).
5. Remove the timing belt (refer to **Removing the Timing Belt [p. 27]**).
6. Remove the large timing pulley (refer to **Removing the Large Timing Pulley [p. 30]**).
7. Remove the weighted brush cover (refer to **Removing the Weighted Brush Cover [p. 32]**).
8. Remove the tape channel plate (refer to **Removing the Tape Channel Plate [p. 34]**).
9. Remove the water tank holder (refer to **Removing the Water Tank Holder [p. 38]**).
10. Detach the solenoid from the spring hooks on the chassey.
11. Remove the screw holding the movable cutter to the solenoid.
12. Rotate the movable cutter assembly towards the front of the machine.
13. Twist the movable cutter assembly and remove from the machine.

The movable cutter assembly is now removed from the machine. At this point a new movable cutter may be installed.

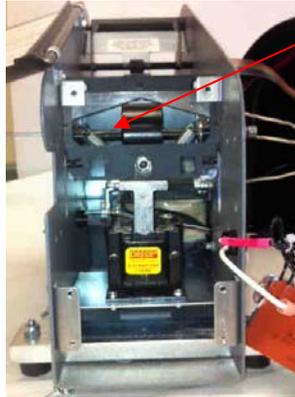
Attaching the Movable Cutter Assembly

To replace the movable cutter assembly, see Fig 24 and follow the steps below.

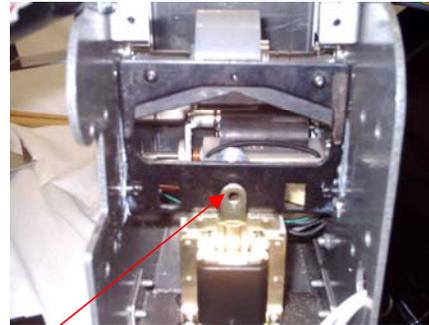
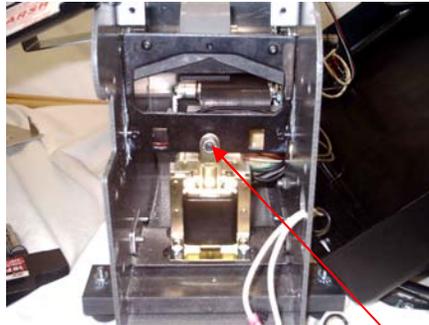
1. Place the movable cutter into the precut slots in the chassis at an angle.
2. Untwist the movable cutter assembly and rotate the movable cutter assembly upwards.
3. Attach the screw holding the movable cutter to the solenoid.
4. Reattach the solenoid to the spring hooks on the chassey.
5. Attach the water tank holder (refer to **Attaching the Water Tank Holder [p. 38]**).
6. Attach the tape channel plate (refer to **Attaching the Tape Channel Plate [p. 34]**).
7. Attach the weighted brush cover (refer to **Attaching the Weighted Brush Cover [p. 32]**).
8. Attach the pinch roller (refer to **Attaching the Pinch Roller [p. 30]**).
9. Attach the left side cover (refer to **Attaching the Left Side Cover [p. 25]**).
10. Attach the right side cover (refer to **Attaching the Right Side Cover [p. 23]**).

The machine is now ready to continue normal operation.

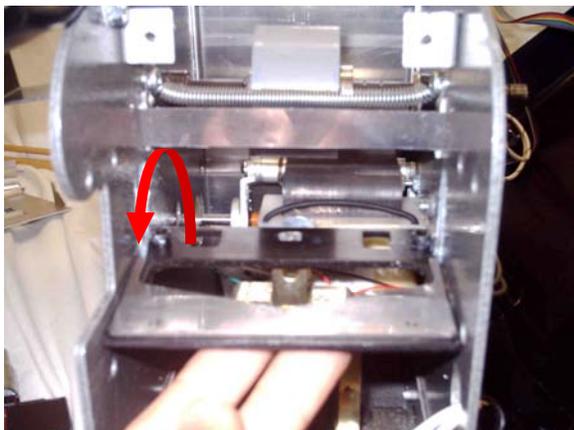
Fig 24 Movable Cutter Assembly



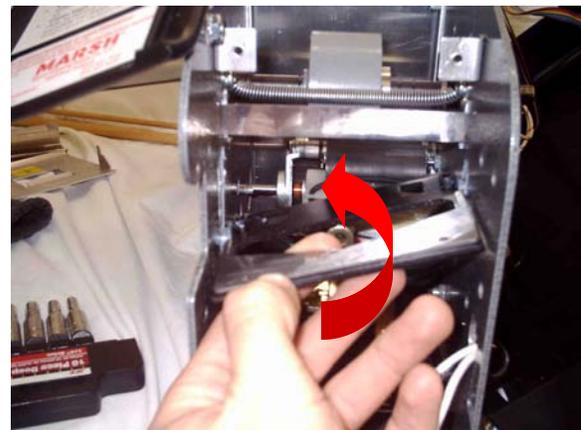
10. Remove the solenoid spring from the shoulder bolt connecting it from the solenoid.



11. Remove the screw holding the movable cutter to the solenoid.



12. Rotate the movable cutter assembly towards the front of the machine.



13. Twist the movable cutter assembly and remove from the machine.

Removing the Gearbox/Motor Mount with the Motor Attached

To remove the gearbox/motor mount, see Fig 25 and follow the steps below.

1. Turn the switch to OFF and unplug the machine.
2. Remove the right side cover (refer to **Removing the Right Side Cover [p. 23]**).
3. Remove the left side cover (refer to **Removing the Left Side Cover [p. 25]**).
4. Remove the timing belt (refer to **Removing the Timing Belt [p. 27]**).
5. Remove the large timing pulley (refer to **Removing the Large Timing Pulley [p. 30]**).
6. Cut the two zip ties closest to the controller board.
7. Remove the connectors labeled MOTOR, SOL, HEATER, and PHOTO EYE from the controller board.
8. Set the HEATER connector off to the side.
9. With one hand holding the encoder wheel, remove the screw holding encoder wheel.
10. Remove the four large screws from the gearbox/motor mount.
11. Pull the gearbox/motor mount assembly out of the machine.
12. Remove all the electrical connections for from the gearbox/motor mount

The gearbox/motor mount is now removed. To replace the gearbox/motor mount, remove the motor and remove all electrical connections from the gearbox/motor mount, then use a new gearbox/motor mount (refer to **Replacing the Motor [p. 62]**).

Attaching the Gearbox/Motor Mount with the Motor Attached

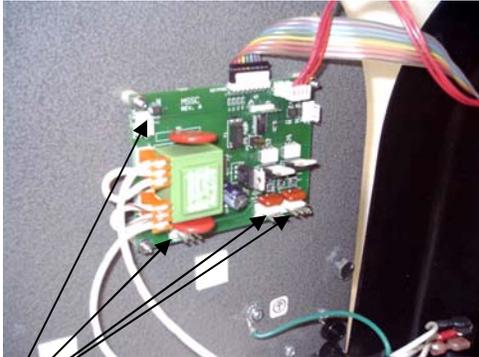
To attach the gearbox/motor mount, see Fig 25, Fig 10 (p. 16), and follow the steps below.

NOTE: The motor must be attached to the gearbox/motor mount during this installation.

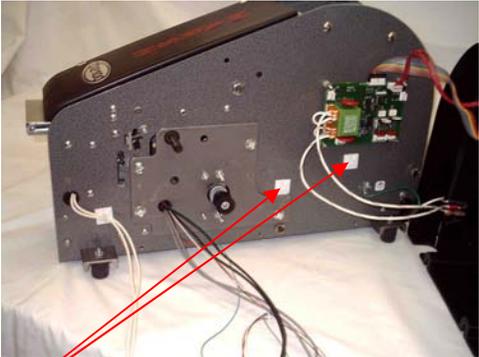
1. Pull the electrical connections for the solenoid, motor, and the encoder through the gearbox/motor mount.
2. Slide the gearbox/motor mount into place making sure that the two pins line up with the holes in the chassis and the feed wheel shaft is installed and through the $\frac{3}{8}$ " bearing.
3. Attach the gearbox/motor mount with the four large screws.
4. Attach the encoder wheel into the shaft of the motor and in the encoder slot.
5. Attach all the connectors to the controller board except the connections labeled KEY PAD and DISPLAY.
6. Attach the wires with two zip ties.
7. Attach the large timing pulley (refer to **Attaching the Large Timing Pulley [p. 30]**).
8. Attach the timing belt (refer to **Attaching the Timing Belt [p. 27]**).
9. Attach the left side cover (refer to **Attaching the Left Side Cover [p. 25]**).
10. Attach the right side cover (refer to **Attaching the Right Side Cover [p. 23]**).

The machine is now ready to continue normal operation.

Fig 25 Gearbox/Motor Mount with the Motor Attached



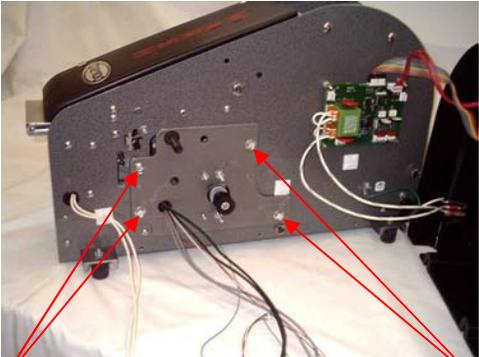
- 6. Cut the two zip ties closest to the controller board.
- 7. Remove the connectors labeled MOTOR, SOL, HEATER, and PHOTO EYE from the controller board.



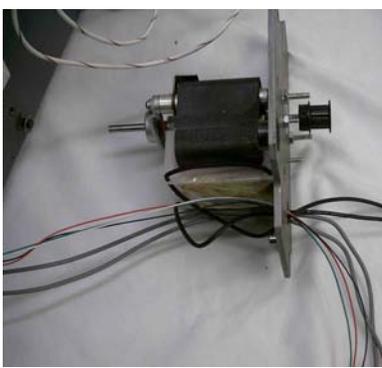
- 8. Set the HEATER connector off to the side.



- 9. With one hand holding the encoder wheel, remove the screw holding encoder wheel.



- 10. Remove the four large screws from the gearbox/motor mount.



- 11. Pull the gearbox/motor mount assembly out of the machine.



- 12. Remove all the electrical connections from the gearbox/motor mount.

Replacing the Movable Cutter Blade

To replace the movable cutter blade, see Fig 26 and follow the steps below.

1. Turn the switch to OFF and unplug the machine.
2. Remove the cutter guard.
3. Remove the right side cover (refer to **Removing the Right Side Cover [p. 23]**).
4. Remove the cutter guard clips.
5. Release the tension from the blade by loosening the set screw.
6. Remove the two remaining screws and lift the moveable cutter blade out of the machine.

NOTE: Place a pencil or screw driver or some other object beneath the cutter blade so that the cutter blade doesn't fall into the machine.

7. With one hand holding the new moveable cutter blade, place the new movable cutter blade so that the two outside screw holes line up and screw the movable cutter blade into place. To prevent the screws from backing out, it is recommended to apply a drop of Loctite #603.
8. Tighten the set screw so that there is a slight bend in the movable cutter blade.
9. Reattach the cutter guard clips
10. Attach the right side cover (refer to **Attaching the Right Side Cover [p. 23]**).
11. Attach the cutter guard.

The machine is now ready to continue normal operation.

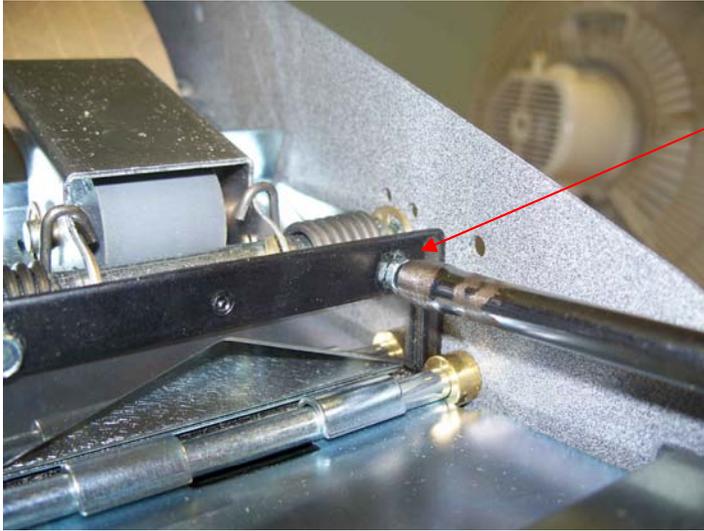
Replacing the Controller Board

To replace the controller board, see Fig 27, Fig 10 (p. 16), and follow the steps below.

1. Remove the right side cover (refer to **Removing the Right Side Cover [p. 23]**).
2. Remove the connectors labeled J1, J2, PHOTO EYE, HEATER, KEYPAD, DIPLAY, MOTOR, and SOL from the controller board.
3. Remove the screws from the controller board.
4. Remove the screws from the standoffs and the chassis
5. Put the new screws into the chassis, with the head on the inside of the machine.
6. Put the new standoffs on the screws.
7. Put the new controller board on the screws and tighten the nuts.
8. Attach the appropriate connectors to J1, J2, PHOTO EYE, HEATER, MOTOR, and SOL to the controller board.
9. Attach the right side cover (refer to **Attaching the Right Side Cover [p. 23]**).

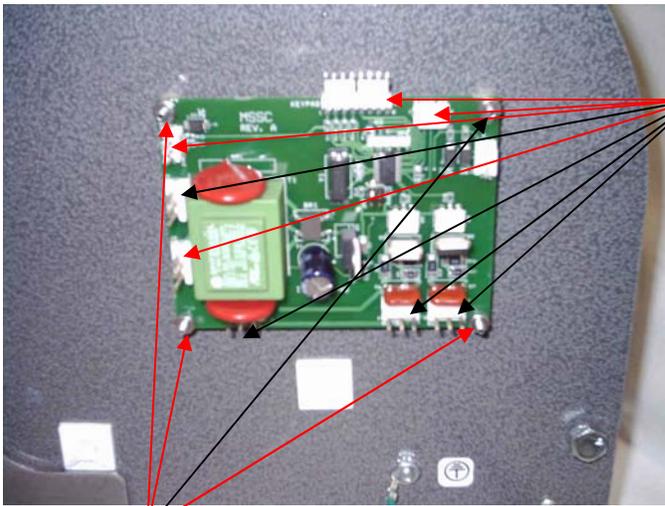
The machine is now ready to continue normal operation.

Fig 26 Moveable Cutter Blade



4. Remove the two remaining screws and lift the moveable cutter blade out of the machine.

Fig 27 Controller Board



2. Remove the connectors labeled J1, J2, PHOTO EYE, HEATER, KEYPAD, DISPLAY, MOTOR, and SOL from the controller board.

3. Remove the screws from the controller board.

To replace the encoder, see Fig 28 and follow the steps below.

1. Turn the switch to OFF and unplug the machine.
2. Remove the right side cover (refer to **Removing the Right Side Cover [p. 23]**).
3. Remove the left side cover (refer to **Removing the Left Side Cover [p. 25]**).
4. Remove the pinch roller (refer to **Removing the Pinch Roller [p. 30]**).
5. Remove the weighted brush cover (refer to **Removing the Weighted Brush Cover [p. 32]**).
6. Remove the tape channel plate (refer to **Removing the Tape Channel Plate [p. 34]**).
7. Facing the left side of the machine, with one hand hold the encoder remove the screws holding the encoder.
8. Place the new encoder on the chassis and screw in the screws.
9. Pass the new encoder wires through the machine and attach to the connector to the controller board at PHOTO EYE.

*NOTE: To adjust the encoder, see **Adjusting the Encoder.***

10. Attach the tape channel plate (refer to **Attaching the Tape Channel Plate [p. 34]**).
11. Attach the weighted brush cover (refer to **Attaching the Weighted Brush Cover [p. 32]**).
12. Attach the pinch roller (refer to **Attaching the Pinch Roller [p. 30]**).
13. Attach the left side cover (refer to **Attaching the Left Side Cover [p. 25]**).
14. Attach the right side cover (refer to **Attaching the Right Side Cover [p. 23]**).

The machine is now ready to continue normal operations

Adjusting the Encoder

To adjust the encoder, see Fig 28 and follow the steps below.

1. Turn the switch to OFF and unplug the machine.
2. Remove the left side cover (refer to **Removing the Left Side Cover [p. 25]**).
3. Facing the left side of the machine, remove the screws holding the encoder base.
4. Place a retaining compound (i.e. loctite) on the screws.
5. Put the screws back into the machine with the encoder attached loose enough that the encoder can be moved.
6. While moving the encoder forward, backward and at various angles, and keeping hands clear of the encoder wheel, run the machine at any given length until the machine is accurate within $\pm 1/2$ ".
7. Holding the encoder in the correct position and tighten the screws so that the encoder is no longer able to move.
8. Attach the left side cover (refer to **Attaching the Left Side Cover [p. 25]**).

Fig 28 Encoder

7. Facing the left side of the machine, with one hand hold the encoder remove the screws holding the encoder.



6. While moving the encoder forward, backward and at various angles, and keeping hands clear of the encoder wheel, run the machine at any given length until the machine is accurate within $\pm 1/2$ ".

Replacing the Brush

To replace the brush, see Fig 29 and follow the steps below.

1. Turn OFF the machine.
2. Let the machine cool for at least 2 minutes.
3. Remove the water bottle.
4. Remove the water tank
5. Remove the brush from the water tank
6. Place the new brush in the tank so that the bristles of the brush lay somewhat level with respect to the ground.
7. Place the water tank and brush into the water tank holder.
8. Place the water bottle onto the water bottle brackets with the post of the water tank into the duckbill valve.

The machine is now ready to continue normal operation.

Replacing the Thermostat Assembly

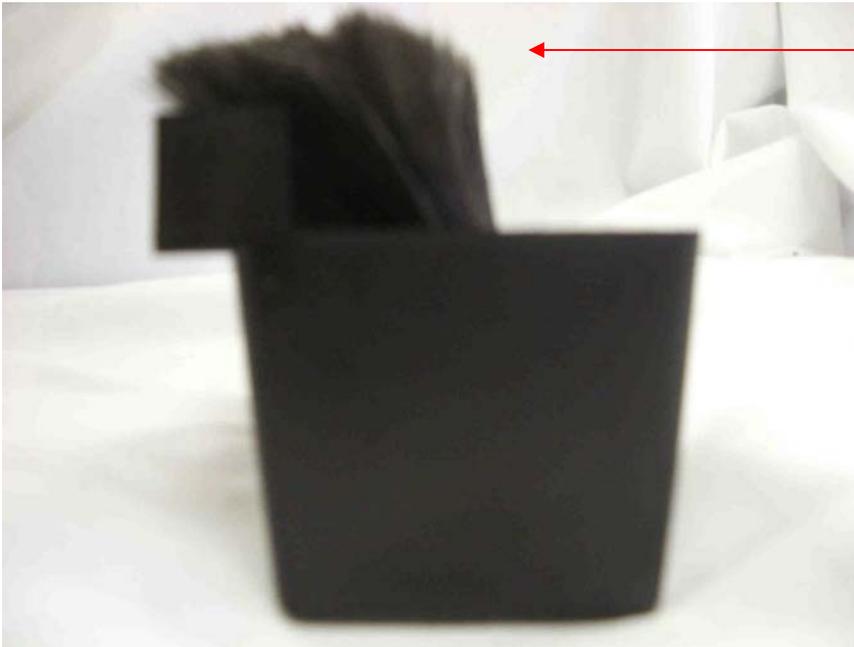
To replace the thermostat assembly, see Fig 30 and follow the steps below.

1. Turn the switch to OFF and unplug the machine.
2. Remove the right side cover (refer to **Removing the Right Side Cover [p. 23]**).
3. Remove the left side cover (refer to **Removing the Left Side Cover [p. 25]**).
4. Remove the water tank holder (refer to **Removing the Water Tank Holder [p. 38]**).
5. With one hand holding a screw driver inside the water tank holder, remove the nuts holding on the thermostat.
6. Attach the new thermostat.

NOTE: The thermostat must have good surface contact.

7. Attach the water tank holder (refer to **Attaching the Water Tank Holder [p. 38]**).
8. Attach the left side cover (refer to **Attaching the Left Side Cover [p. 25]**).
9. Attach the right side cover (refer to **Attaching the Right Side Cover [p. 23]**).

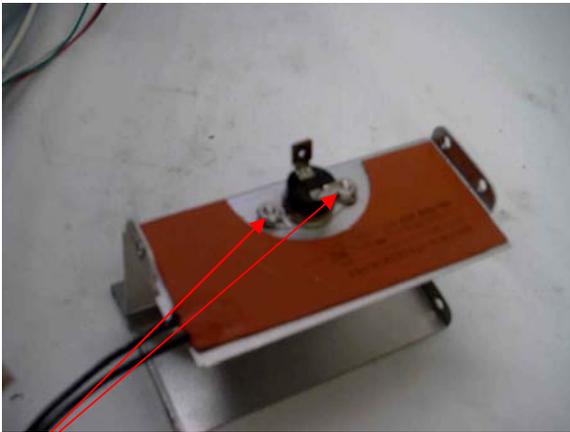
The machine is now ready to continue normal operation.

Fig 29 Brush

6. Place the new brush in the tank so that the bristles of the brush lay somewhat level with respect to the ground.



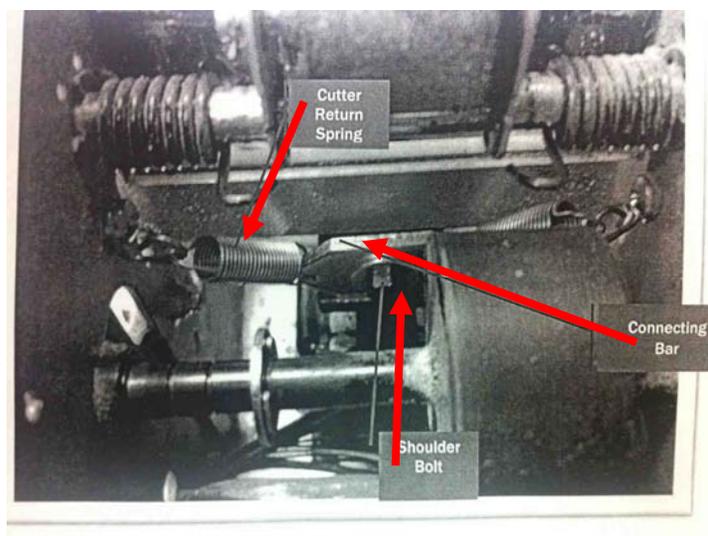
**NOT PEPENDICULAR
TO THE GROUND**

Fig 30 Thermostat Assembly

5. With one hand holding a screw driver inside the water tank holder, remove the nuts holding on the thermostat.

Replacing the Solenoid Return Spring

1. Remove the water bottle and brush tank.
2. Remove the Pressure plate.
3. Remove the right side cover.
 - a) Remove the 6 screws retaining the right side cover. (3 in bottom edge, 1 above the brush tank shelf, 1 above tape channel, 1 in upper part of tape basket area.
 - b) Set cover aside leaving wires attached.
4. Remove the left side cover.
5. Remove front plate.
6. Remove the cutter guard.
7. Loosen spring tension on the pinch roller assembly.
8. Remove tape weight assembly from the machine.
9. Remove the water tank shelf, leaving the heater and wiring attached.
10. Remove the belt and the large pulley.
11. Remove the two Philips head screws retaining the tape channel.
12. Remove the hex head bolts retaining the rear of the tape channel and remove the tape channel sliding backward and upward.
13. Remove e-clip from urethane feed roll shaft, remove washer, and slide feed roll all the way to the left.
14. Remove the old solenoid return spring.
15. Remove Nylon locknut and remove old shoulder bolt from solenoid/blade holder assembly.
16. If old return spring was NOT attached to spring clips, attach spring clips to sides of chassis with screws and locknuts.
17. Install new shoulder bolt, washer, connecting bar, cutter return springs, passing thru ears on solenoid and thru blade holder. Secure with Nylon locknut.
18. Attach ends of cutter return springs to spring clips. Make sure blade holder travels freely.
19. Re-assemble unit in reverse order of dis-assembly.



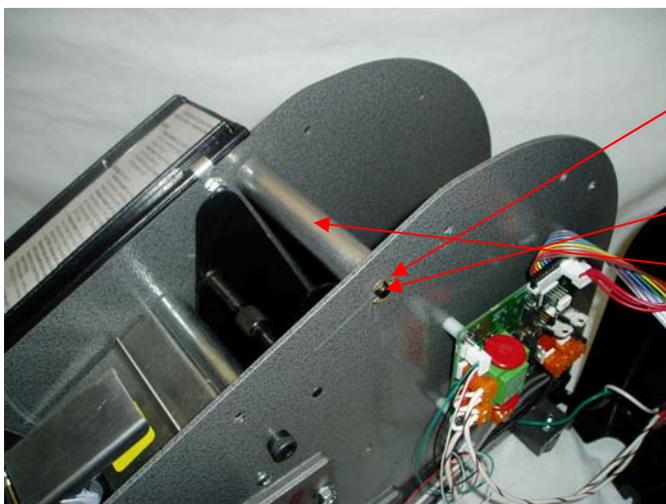
Replacing the Top Roller

To replace the top roller, see Fig 32 and follow the steps below.

1. Turn the switch to OFF and unplug the machine.
2. Remove the right side cover (refer to **Removing the Right Side Cover [p. 23]**).
3. Remove the e-clips from the top roller shaft.
4. Remove the top roller shaft.
5. Remove the top roller tube.
6. Place the new top roller into the middle of the chassis and hold.
7. Insert the new top roller shaft into the chassis and into the top roller and through the other side of the chassis.
8. Attach the e-clips to each side of the slide roller shaft.
9. Attach the right side cover (refer to **Attaching the Right Side Cover [p. 23]**).

The machine is now ready to continue normal operation.

Fig 32 Top Roller



3. Remove the e-clips from the top roller shaft.

4. Remove the top roller shaft.

5. Remove the top roller tube.

Replacing the Free Spin Roller Assembly

To replace the free spin roller assembly, see Fig 33 and follow the steps below.

1. Turn the switch to OFF and unplug the machine.
2. Remove the right side cover (refer to **Removing the Right Side Cover [p. 23]**).
3. Remove the left side cover (refer to **Removing the Left Side Cover [p. 25]**).
4. Remove the e-clips from the free spin roller shaft.
5. Remove the free spin roller shaft.
6. Remove the free spin roller tube.
7. Place the new free spin roller tube into the middle of the chassis and hold.
8. Insert the new free spin roller shaft into the chassis and the free spin roller tube and through the other side of the chassis.
9. Attach the e-clips to each side of the free spin roller shaft.
10. Attach the left side cover (refer to **Attaching the Left Side Cover [p. 25]**).
11. Attach the right side cover (refer to **Attaching the Right Side Cover [p. 23]**).

The machine is now ready to continue normal operation.

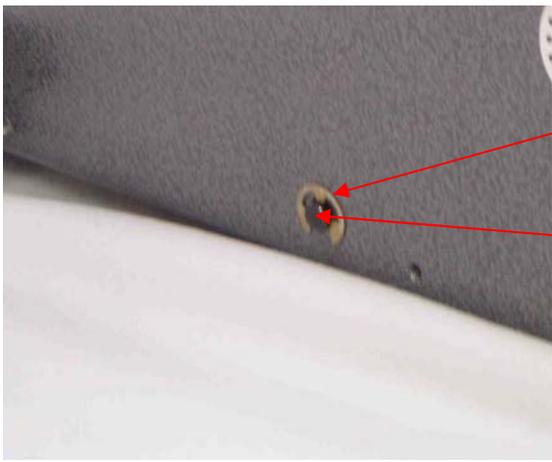
Replacing the Ramp

To replace the ramp, see Fig 34 and follow the steps below.

1. Turn the switch to OFF and unplug the machine.
2. Remove the right side cover (refer to **Removing the Right Side Cover [p. 23]**).
3. Remove the left side cover (refer to **Removing the Left Side Cover [p. 25]**).
4. Remove the four screws holding the ramp in and remove the ramp.
5. Attach the four screws to the new ramp inside the machine so that the thicker end of the ramp is toward the rear of the machine.
6. Attach the left side cover (refer to **Attaching the Left Side Cover [p. 25]**).
7. Attach the right side cover (refer to **Attaching the Right Side Cover [p. 23]**).

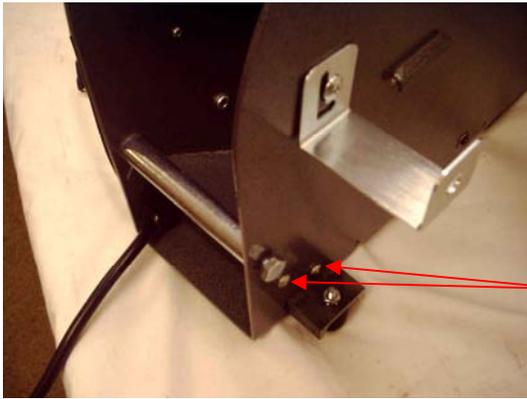
The machine is now ready to continue normal operations

Fig 33 Free Spin Roller Assembly

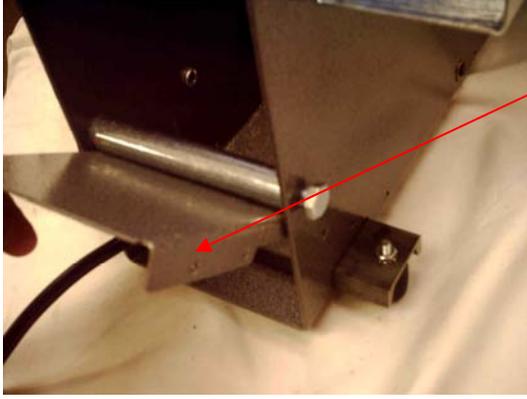


- 4. Remove the e-clips from the free spin roller shaft.
- 5. Remove the free spin roller shaft.

Fig 34 Ramp



- 4. Remove the four screws holding the ramp in and remove the ramp.



- 6. Attach the four screws to the new ramp inside the machine so that the thicker end of the ramp is toward the rear of the machine.

Replacing the Tape Guide Assembly

To replace the tape guide assembly, see Fig 35 and follow the steps below.

1. Turn the switch to OFF and unplug the machine.
2. Remove the right side cover (refer to **Removing the Right Side Cover [p. 23]**).
3. Remove the left side cover (refer to **Removing the Left Side Cover [p. 25]**).
4. Remove the pressure plate
5. Loosen the screws in the coder bar, dead roller, tape basket/motor cover, tape channel plate, and the weighted brush cover shaft.
6. With the tape guides set towards the middle of the machine and one hand spreading the chassis apart, pull the turnbuckle to one side of the machine, twist the turnbuckle slightly and pull the assembly out the rear of the machine.
7. With the new tape guides set towards the middle of the machine and slightly twisted, and one hand spreading the chassis apart, put both ends of the turnbuckle into the chassis.
8. Tighten the screws in the coder bar, dead roller, tape basket/motor cover, tape channel plate, and the weighted brush cover shaft.
9. Attach the left side cover (refer to **Attaching the Left Side Cover [p. 25]**).
10. Attach the right side cover (refer to **Attaching the Right Side Cover [p. 23]**).

The machine is now ready to continue normal operation.

Replacing the Fixed Blade

To replace the fixed blade, see Fig 36 and follow the steps below.

1. Turn the switch to OFF and unplug the machine.
2. Remove the right side cover (refer to **Removing the Right Side Cover [p. 23]**).
3. Use a pair of need-nose pliers to remove the springs that are attached to the blade shoe.
4. Remove the screw retaining the fixed blade to the blade shoe.
5. Remove the fixed blade using the same pair of needle-nose pliers
6. Insert the new fixed blade into the chassis. The blade should be resting on both sides of the chassis and on the bottom edge of the shoe. (You may have to remove the cutter guard to make sure it is doing so.)

CAUTION: Do not drop any components into the machine.

7. Pull the shoe (along with the fixed blade) towards the front of the machine.
8. Reattach the extension springs to the fixed blade shoe.
9. Attach the right side cover (refer to **Attaching the Right Side Cover [p. 23]**).

Fig 35 Tape Guide Assembly

6. With the tape guides set towards the middle of the machine and one hand spreading the chassis apart, pull the turnbuckle to one side of the machine, twist the turnbuckle slightly and pull the assembly out the rear of the machine.

Fig 36 Fixed Blade

3. Use a pair of need-nose pliers to remove the springs that are attached to the blade shoe.



4. Remove the fixed blade using the same pair of needle-nose pliers.

Replacing the Front Cover for Serial Numbers 606422 and After

1. To replace the new version, remove the screws on the front of the machine and the cover will be removable.

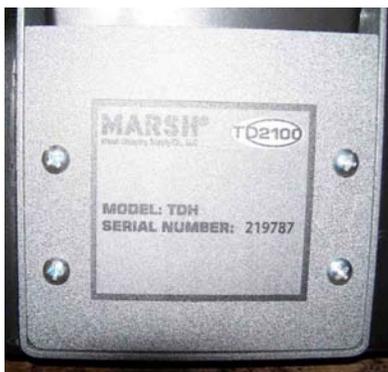
Replacing the Front Cover for Serial Numbers 606421 and Below

To replace the front cover, see Fig 37 and follow the steps below.

1. Turn the switch to OFF and unplug the machine.
2. Remove the right side cover (refer to **Removing the Right Side Cover [p. 23]**).
3. Remove the left side cover (refer to **Removing the Left Side Cover [p. 25]**).
4. Loosen the screws in the coder bar, dead roller, brush tank holder, and the weighted brush cover shaft.
5. Remove the four screws from the front cover.
6. Remove the front cover
7. With one hand pushing the chassis slightly apart, position the new front cover.
8. Attach the screws to the front cover.
9. Tighten the screws in the coder bar, dead roller, brush tank holder, and the weighted brush cover shaft.
10. Attach the left side cover (refer to **Attaching the Left Side Cover [p. 25]**).
11. Attach the right side cover (refer to **Attaching the Right Side Cover [p. 23]**).

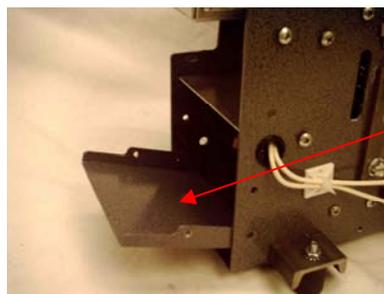
The machine is now ready to continue normal operation.

**Fig 37a Front Cover for
Serial Numbers 606422 and after**



1. Remove the screws on the front of the machine and the cover will be removable.

**Fig 37b Front Cover for
Serial Numbers 606421 and Below**



7. With one hand pushing the chassis slightly apart, position the new front cover.

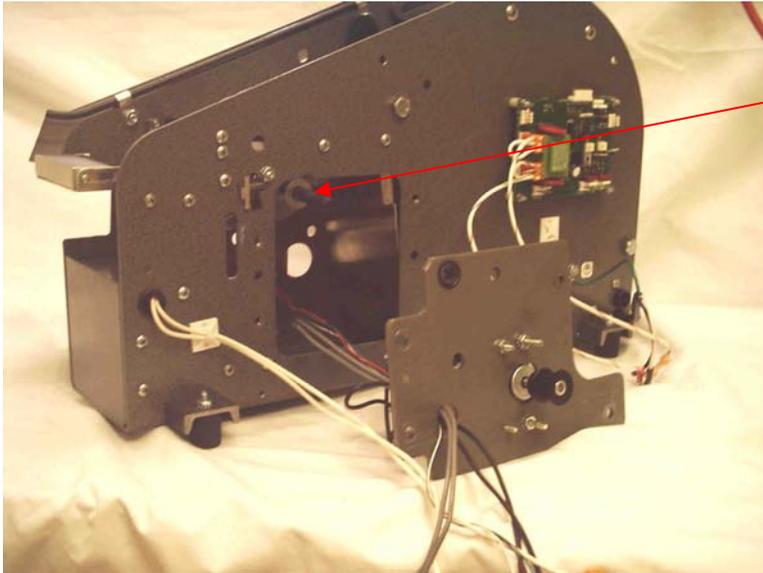
Replacing the Feed Wheel

To replace the feed wheel, see Fig 38 and follow the steps below.

1. Turn the switch to OFF and unplug the machine.
2. Remove the right side cover (refer to **Removing the Right Side Cover [p. 23]**).
3. Remove the left side cover (refer to **Removing the Left Side Cover [p. 25]**).
4. Remove the timing belt (refer to **Removing the Timing Belt [p. 27]**).
5. Remove the large timing pulley (refer to **Removing the Large Timing Pulley [p. 30]**).
6. Remove the gearbox/motor mount (refer to **Removing the Gearbox/Motor Mount [p. 42]**).
7. Remove the feed wheel shaft and the feed wheel from the chassis at a downward angle.
8. Attach the e-clip and the washer to the new feed wheel shaft
9. Insert the new feed wheel shaft and feed wheel into the chassis into the bearing.
10. Attach the gearbox/motor mount (refer to **Attaching the Gearbox/Motor Mount [p. 43]**).
11. Attach the large timing pulley (refer to **Attaching the Large Timing Pulley [p. 30]**).
12. Attach the timing belt (refer to **Attaching the Timing Belt [p. 27]**).
13. Attach the left side cover (refer to **Attaching the Left Side Cover [p. 25]**).
14. Attach the right side cover (refer to **Attaching the Right Side Cover [p. 23]**).

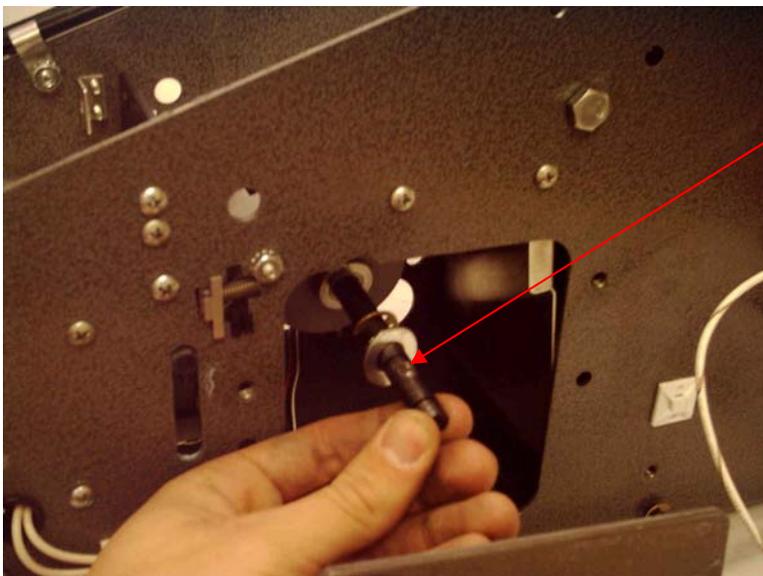
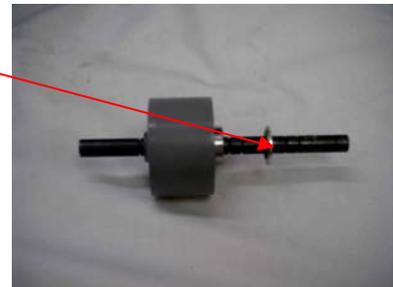
The machine is now ready to continue normal operation.

Fig 38 Feed Wheel



7. Remove the feed wheel shaft and the feed wheel from the chassis at a downward angle.

8. Attach the e-clip and the washer to the new feed wheel shaft



9. Insert the new feed wheel shaft and feed wheel into the chassis into the bearing.

Replacing the Solenoid

To replace the solenoid, see Fig 39 and follow the steps below.

1. Turn the switch to OFF and unplug the machine.
2. Remove the right side cover (refer to **Removing the Right Side Cover [p. 23]**).
3. Remove the left side cover (refer to **Removing the Left Side Cover [p. 25]**).
4. Remove the pinch roller (refer to **Removing the Pinch Roller [p. 30]**).
5. Remove the weighted brush cover (refer to **Removing the Weighted Brush Cover [p. 32]**).
6. Remove the tape channel plate (refer to **Removing the Tape Channel Plate [p. 34]**).
7. Remove the water tank holder (refer to **Removing the Water Tank Holder [p. 38]**).
8. Remove the screw holding the movable cutter to the solenoid.
9. Remove the movable cutter (refer to **Removing the Movable Cutter Assembly [p. 38]**).
10. Cut the two zip ties closest to the controller board.
11. Remove the connectors labeled SOL and HEATER from the controller board.
12. Remove the four screws holding the solenoid.
13. Remove the solenoid.
14. Remove the solenoid connection from the gearbox/motor mount.
15. Pull the solenoid electrical connection through the gearbox/motor mount.
16. Place the new solenoid into the chassis
17. Attach the four screws into the solenoid mounting shelf.
18. Attach the movable cutter (refer to **Attaching the Movable Cutter Assembly [p. 38]**).
19. Attach all the connectors to the controller board except the connections labeled KEY PAD and DISPLAY.
20. Attach the wires with two zip ties.
21. Attach the water tank holder (refer to **Attaching the Water Tank Holder [p. 38]**).
22. Attach the tape channel plate (refer to **Attaching the Tape Channel Plate [p. 34]**).
23. Attach the weighted brush cover (refer to **Attaching the Weighted Brush Cover [p. 32]**).
24. Attach the pinch roller (refer to **Attaching the Pinch Roller [p. 30]**).
25. Attach the left side cover (refer to **Attaching the Left Side Cover [p. 25]**).
26. Attach the right side cover (refer to **Attaching the Right Side Cover [p. 23]**).

The machine is now ready to continue normal operation.

Replacing the Motor

To replace the motor, see Fig 40 and follow the steps below.

1. Turn the switch to OFF and unplug the machine.
2. Remove the right side cover (refer to **Removing the Right Side Cover [p. 23]**).
3. Remove the left side cover (refer to **Removing the Left Side Cover [p. 25]**).
4. Remove the timing belt (refer to **Removing the Timing Belt [p. 27]**).
5. Remove the large timing pulley (refer to **Removing the Large Timing Pulley [p. 30]**).
6. Remove the gearbox/motor mount (refer to **Removing the Gearbox/Motor Mount [p. 42]**).
7. Remove the motor electrical connections from the gearbox/motor mount.
8. Remove the four screws attaching the gearbox/motor mount and the motor.
9. Pull the motor electrical connections through the gearbox/motor mount.
10. Place the new motor onto the gearbox/motor mount.

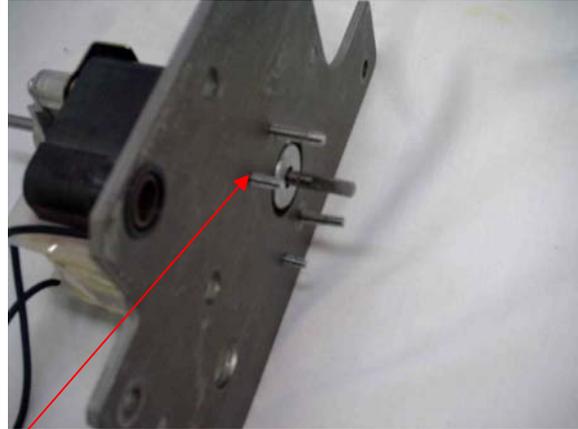
NOTE: The motor must be square to the gearbox/motor mount. Use the white plastic as a guide. The motor is square when all of the plastic is touching the gearbox/motor mount.

11. Snug the nut on the inside of the top screw on the left side of the gearbox/motor mount.
12. Snug the nut on the outside of the top screw on the left side of the gearbox/motor mount.
13. Looking at the outside surface of the gearbox/motor mount, attach the screws that are on the left hand side of the gearbox/motor mount tightly and the nuts on the right snugly.
14. Attach the gearbox/motor mount (refer to **Attaching the Gearbox/Motor Mount [p. 43]**).
15. Attach the large timing pulley (refer to **Attaching the Large Timing Pulley [p. 30]**).
16. Attach the timing belt (refer to **Attaching the Timing Belt [p. 27]**).
17. Attach the left side cover (refer to **Attaching the Left Side Cover [p. 25]**).
18. Attach the right side cover (refer to **Attaching the Right Side Cover [p. 23]**).

The machine is now ready to continue normal operation.

Fig 40 Motor

9. Pull the motor electrical connections through the gearbox/motor mount.



10. Place the new motor onto the gearbox/motor mount.

11. Snug the nut on the inside of the top screw on the left side of the gearbox/motor mount.

12. Snug the nut on the outside of the top screw on the left side of the gearbox/motor mount.



NOTE: The motor is square when all of the plastic is touching the gearbox/motor mount.



13. Looking at the outside surface of the gearbox/motor mount, attach the screws that are on the left hand side of the gearbox/motor mount tightly and the nuts on the right snugly

Parts Lists

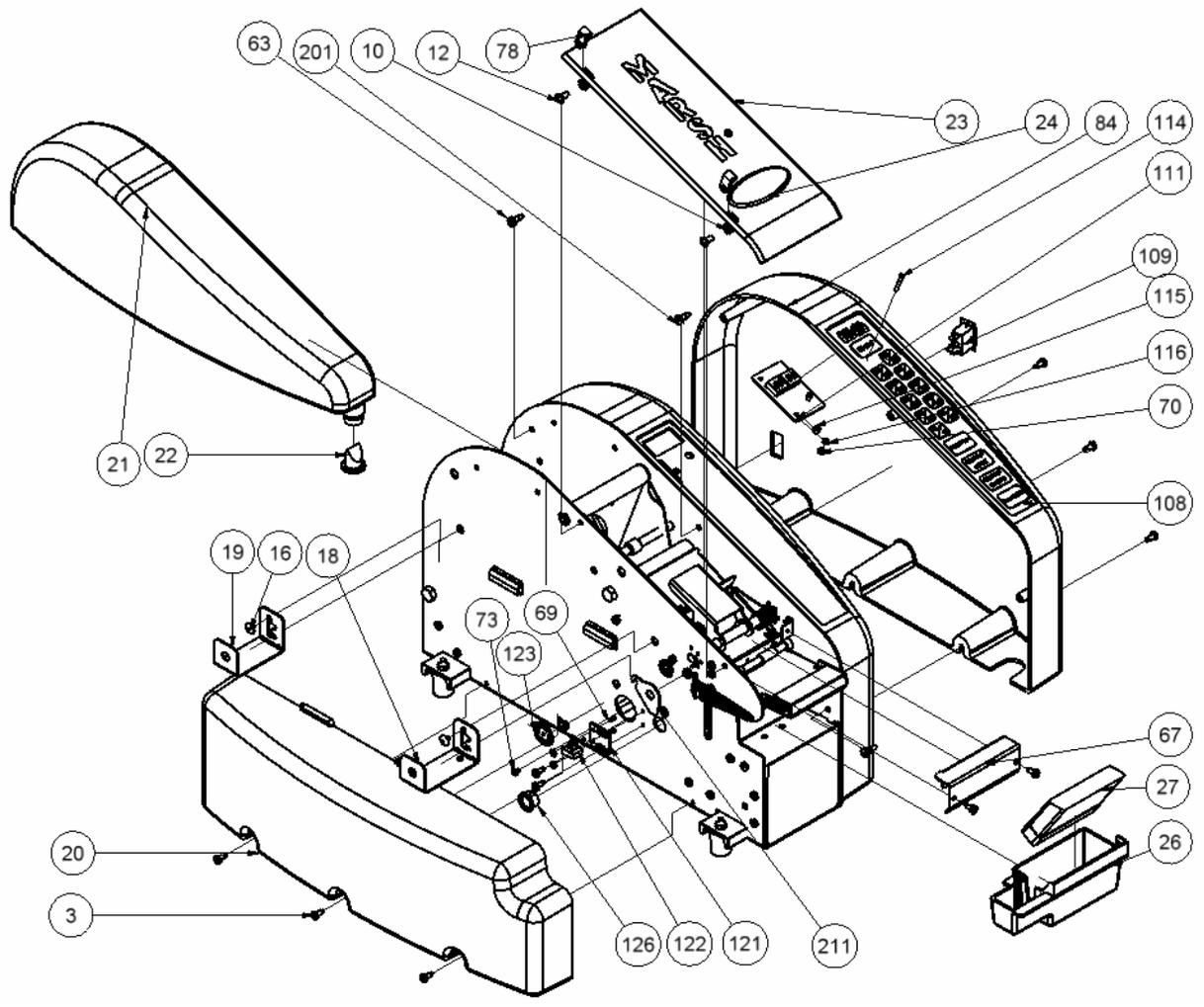
Replacement Part Table for
TD 2100 Electric Drawing #1

Replacement Part Number	Description	Item Number	Item Description	Quantity
RP40310	Top Cover Assembly	23	Top Cover	1
		24	Logo	1
		10	Nut	2
		78	Hinge	2
		12	Screw	2
RP40311	Top Cover Hinge with Screw	78	Hinge	2
		10	Nut	2
		12	Screw	2
RP40401	Water Bottle with Valve	21	Bottle	1
		22	Duckbill Valve	1
RP40403	Front Water Bottle Bracket with Screw	18	Bracket	1
		16	Screw	1
RP40404	Rear Water Bottle Bracket with Screw	19	Bracket	1
		16	Screw	1
RP40405	Brush Tank	26	Tank	1
RP40407	Moistening Brush	27	Brush	1
RP42301	Right Side Cover Assembly	84	Side Cover	1
		114	Screw	1
		3	Screw	3
		63	Screw	1
		108	Keypad	1
		201	Screw	2
		109	Switch	1
		111	Display Board	1
		115	Standoff	1
		116	Washer	1
		70	Nut	1
RP40305	Left Side Cover	NS	Keypad Insert	1
		20	Side Cover	1
RP42410	Encoder Assembly	3	Screw	3
		73	Screw	1
		122	Encoder Switch	1
		3	Screw	2
		123	Encoder Wheel	1
		121	Encoder Bracket	1
		69	Screw	2
		70	Nut	2
126	Split Bushing	1		
NS	Connectors			

Replacement Part Table for
TD 2100 Electric Drawing #1

Replacement Part Number	Description	Item Number	Item Description	Quantity
RP40325	Cutter Guard with Screws	67	Guard	1
		NS	Sticker	1
		3	Screw	2
RP150536	Power Switch	109	Switch	1
RP42405	Display Board and Cable	111	Display Board	1
		NS	Cable	1
RP40825	Fixed Blade Stop	211	Fixed Blade Stop	1

TD 2100 Electric Drawing #1



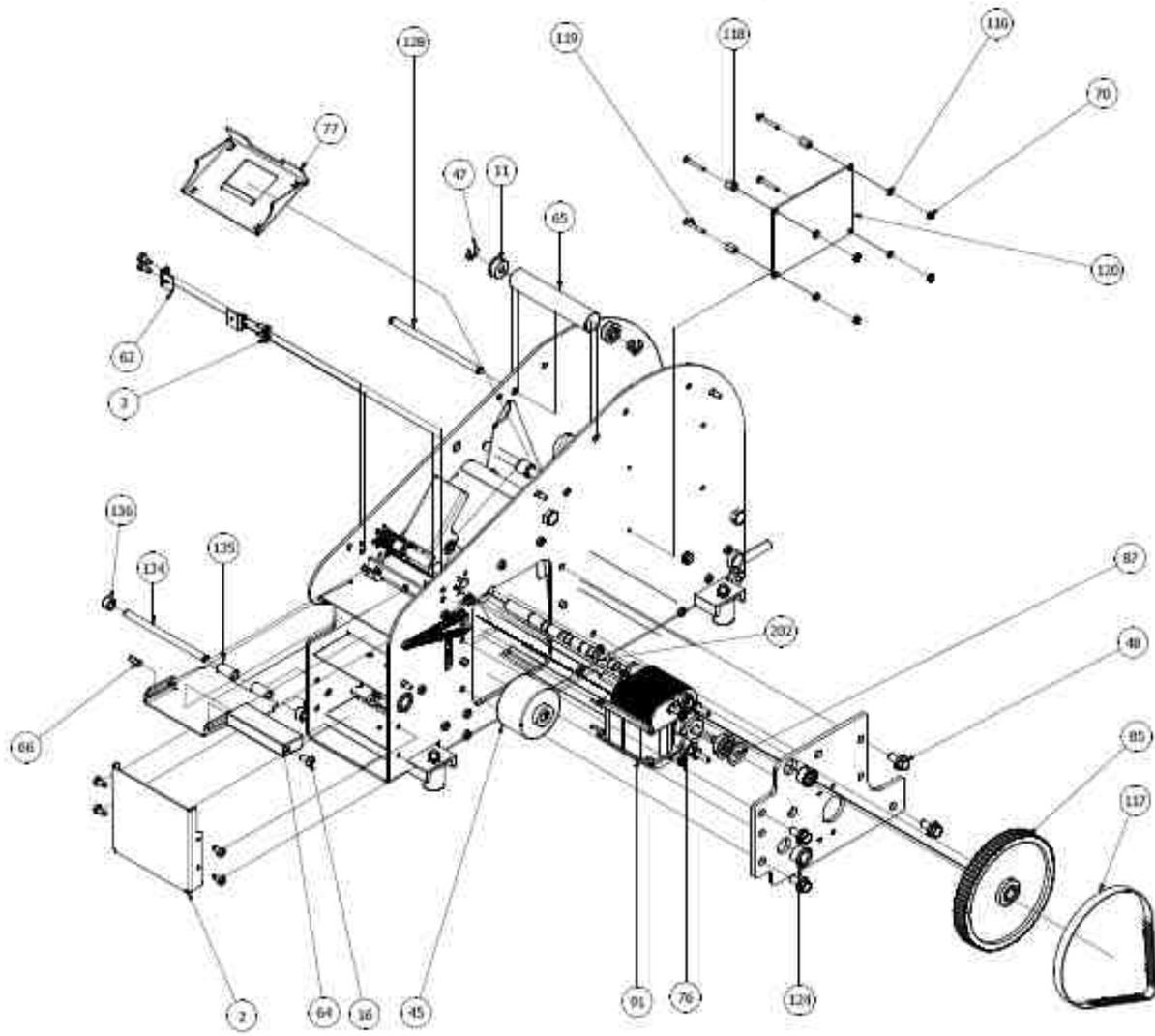
Replacement Part Table for
TD 2100 Electric Drawing #2

Replacement Part Number	Description	Item Number	Item Description	Quantity
RP40230	Feed Wheel Shaft	39	Shaft	1
RP40231	3/8 Bearing	40	Bearing	2
RP40315	Front Cover and Ramp	2	Cover	1
		3	Screw	4
RP40505	Pressure Plate	NS	Sticker	1
		77	Plate	1
RP40516	Brush Tank Cover With Rod and Bushings	135	Weighted Tank Cover	1
		3	Screw	2
		136	Brass Bushing	2
		134	Rod	1
RP40517	Tape Weight with Screw	64	Weight	1
		16	Screw	1
		66	Pin	1
RP40545	Urethane Feed Wheel	45	Wheel	1
		202	Screw	2
RP40570	Complete Slide Roller Assembly	NS	Tube	1
		NS	Bearing	2
		NS	Shaft	1
		NS	Screw	2
		NS	Bracket	2
		NS	Screw	4
RP41101	Gearbox/Motor Mount Frame with Pins	42	Gearbox/Motor Frame	1
		49	Pin	2
RP42210	120V Motor	91	Motor	1
		76	Nut	2
		98	Nut	2
		NS	Connector	1
RP42811	220V Motor	91	Motor	1
		76	Nut	2
		98	Nut	2
		NS	Connector	1

Replacement Part Table for
TD 2100 Electric Drawing #2

Replacement Part Number	Description	Item Number	Item Description	Quantity
RP42220	Small Timing Pulley	87	Pulley	1
		203	Screw	1
RP42230	Large Timing Pulley	85	Pulley	1
		47	Screw	1
RP42240	Timing Belt	117	Belt	1
RP42401	Controller Board Assembly 110V	119	Screw	4
		120	Board 110V	1
		118	Standoff	4
		116	Washer	4
		70	Nut	4
RP40236	Cutter Guard Clip	62	Clip	1
		3	Screw	2
RP42402	Controller Board Assembly 220V	119	Screw	4
		120	Board 220V	1
		118	Standoff	4
		116	Washer	4
		70	Nut	4
RP40522	Top Roller Assembly	129	Roller Tube	1
		15	Bearing	2
		128	Shaft	1
		61	E-Clip	2

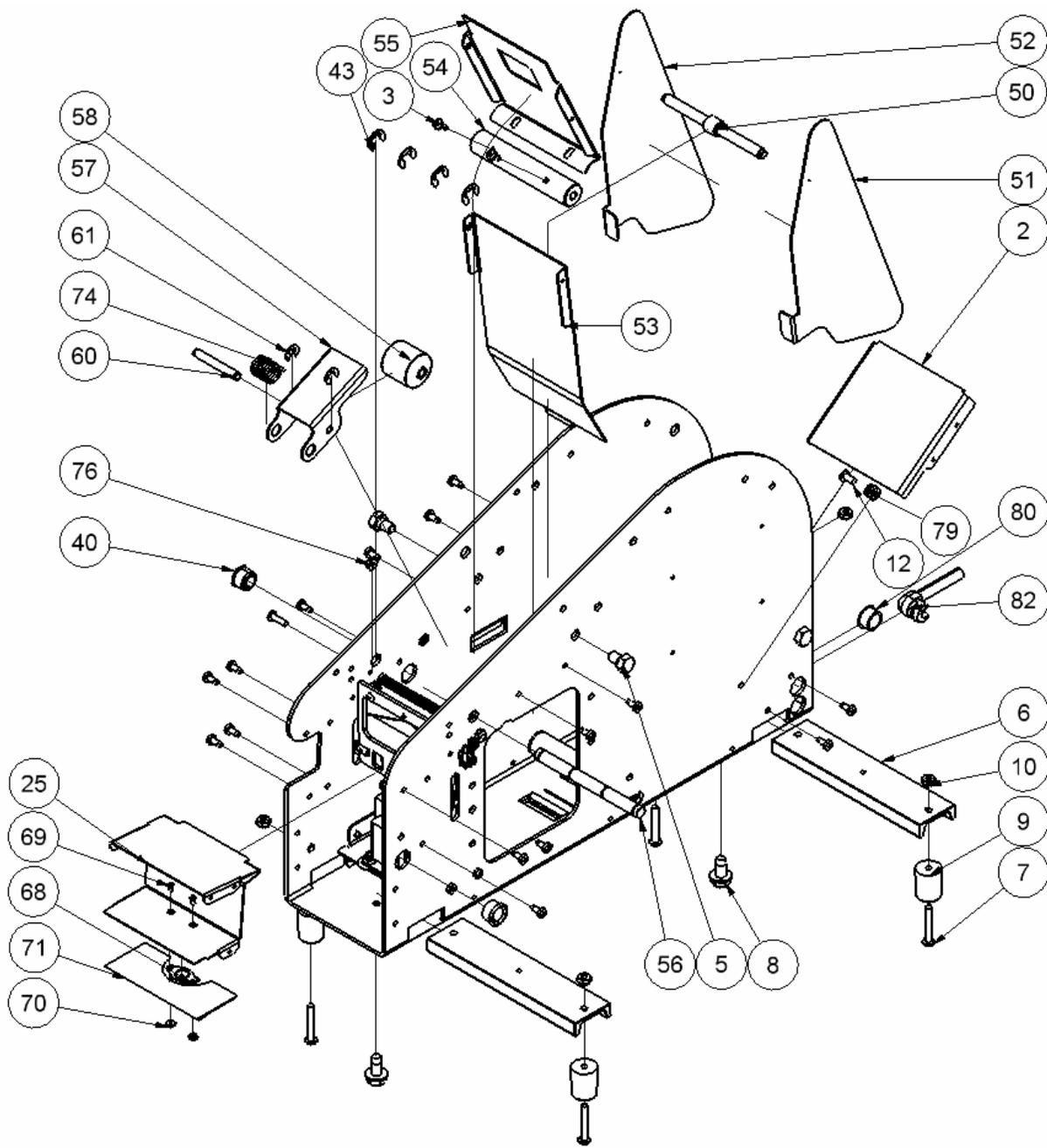
TD 2100 Electric Drawing #2



Replacement Part Table for
TD 2100 Electric Drawing #3

Replacement Part Number	Description	Item Number	Item Description	Quantity
RP40110	Foot Channel	6	Bar	1
		8	Screw	1
RP40115	Rubber Foot	9	Rubber Foot	1
		7	Screw	1
		10	Nut	1
RP40320	Tape Basket/Motor Cover	53	Aluminum Plate	1
		3	Screw	2
RP40515	Tape Channel Plate	55	Plate	1
		3	Screw	2
RP40540	Pinch Roll Assembly	60	Pin	1
		74	Spring	1
		61	E-Clip	2
		56	Shaft	1
		57	Holder	1
		58	Roll	1
RP40550	Tape Guide Assembly	50	Turnbuckle	1
		51	Guide RHS	1
		52	Guide LHS	1
RP40560	Dead Roller	54	Roll	1
		5	Screw	2
RP42956	90° Strain Relief	82	Power Cord Relief	1
RP42957	Dome Plug	80	Plug	1
RP42958	Split Bushing	126	Split Bushing	1
RP42978	Heater/Thermostat Assembly 110V	25	Water Tank Holder	1
		68	Thermostat 110V	1
		69	Screw	2
		70	Nut	2
		71	Heater 110V	1
		3	Screw	7
		NS	Wire	
		NS	Wire Connections	
RP42977	Thermostat Assembly 110V	68	Thermostat	1
		69	Screw	2
		70	Nut	2
		NS	Wire	
		NS	Wire Connections	
RP42810	Heater/Thermostat Assembly 220V	25	Water Tank Holder	1
		68	Thermostat 220V	1
		69	Screw	2
		70	Nut	2
		71	Heater 220V	1
		3	Screw	7
		NS	Wire	
		NS	Wire Connections	

TD 2100 Electric Drawing #3



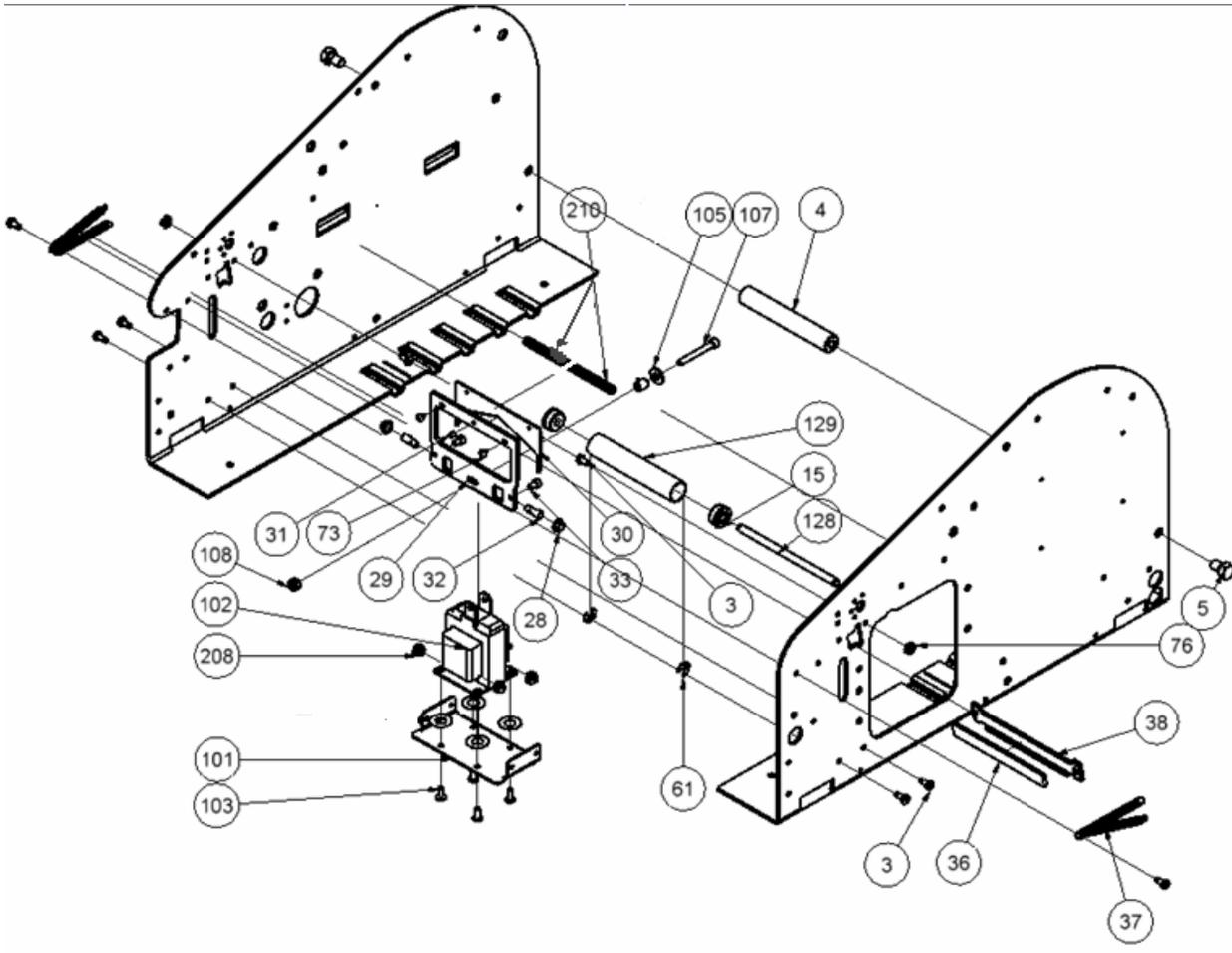
Replacement Part Table for
TD 2100 Electric Drawing #4

Replacement Part Number	Description	Item Number	Item Description	Quantity
RP40522	Free Spin Roller Assembly	129	Roller Tube	1
		15	Bearing	2
		128	Shaft	1
		61	E-Clip	2
RP40580	Coder Roller	4	Roller	1
RP40701	Cutter Replacement Kit	29	Cutter Blade Holder	1
		30	Cutter Blade-Movable	1
		36	Fixed Blade	1
		37	Fixed Blade Shoe	2
		38	Spring	2
		31	Set Screw	1
		73	Screw	2
		33	Screw	2
		28	Bushing	2
		32	Cutter Guide	2
RP40710	Cutter Blade-Movable	30	Cutter Blade-Movable	1
		73	Screw	2
		31	Set Screw	1
RP40715	Cutter Blade-Fixed	36	Fixed Blade	1
		38	Extension Spring	4
		NS	Screw	1
		37	Fixed Blade Shoe	1
RP40740	Cutter Springs-Fixed Blade	38	Extension Spring	4
RP42160	Solenoid Spring	210	Solenoid Spring	2
		3	Screw	2
		NS	Spring Clips	2
		76	Nut	3
		105	Washer	2
		NS	Connection Bar	1
		107	Shoulder Bolt	1
RP42150	Solenoid Assembly 110V	102	Solenoid, 110V	1
		101	Mounting Shelf	1
		103	Screw	6
		208	Nut	4
		107	Shoulder Bolt	1
		105	Washer	1
		210	Solenoid Spring	2
		NS	Connection Bar	1
		NS	Wires	
		NS	Connections	

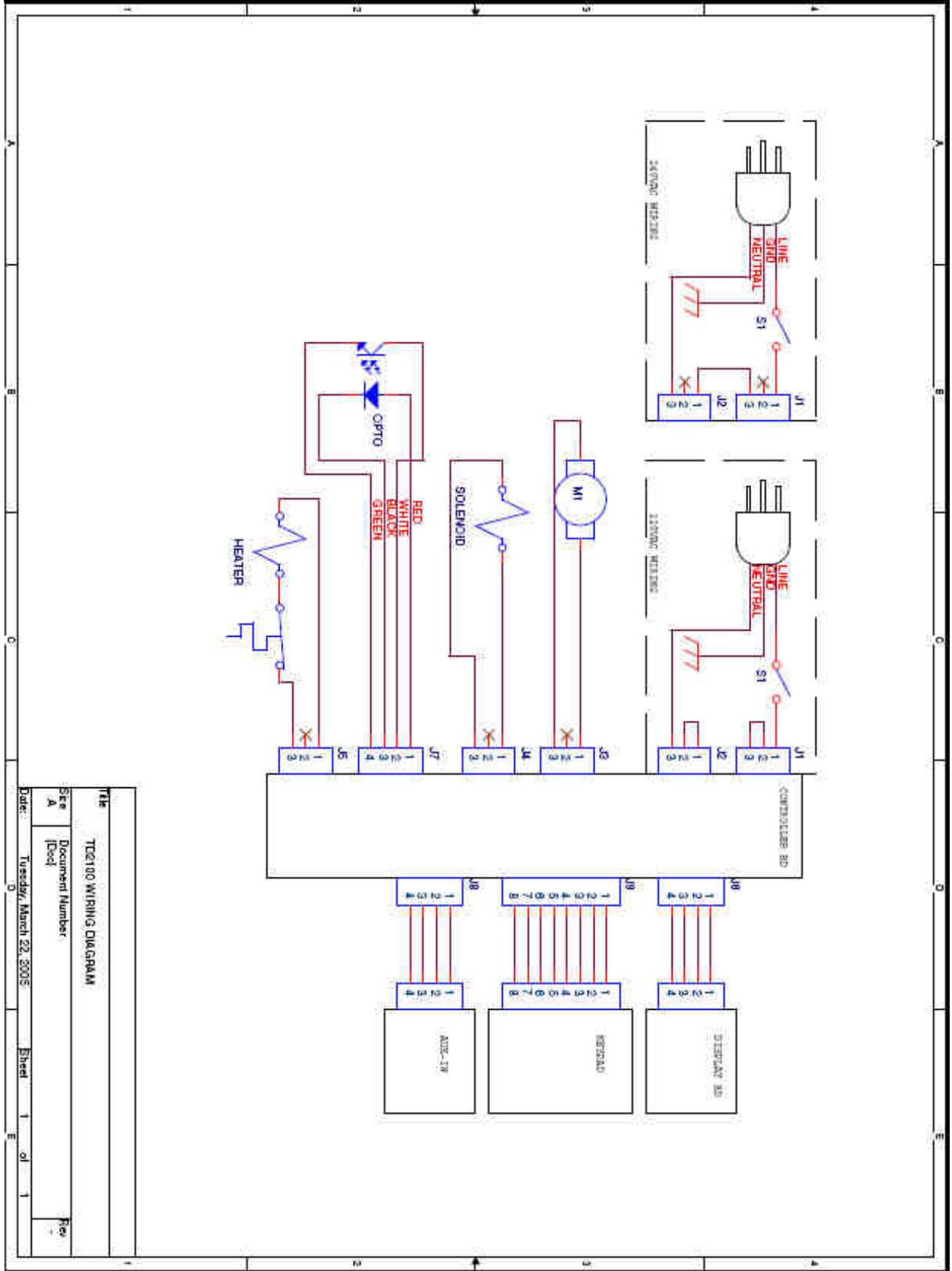
Replacement Part Table for
TD 2100 Electric Drawing #4

RP42151	Solenoid Assembly 220V	102	Solenoid, 220V	1
		101	Mounting Shelf	1
		103	Screw	4
		208	Nut	5
		107	Shoulder Bolt	1
		105	Washer	1
		NS	Wires	
		NS	Connections	

TD 2100 Electric Drawing #4



Wiring Diagram



Title	TC2100 WIRING DIAGRAM
See Document Number	
Date	Tuesday, March 22, 2005
Sheet	1 of 1

Addendum

Removing the Weighted Brush Cover

To remove the weighted brush cover, see Fig 41 and follow the steps below.

1. Remove the water bottle.
2. Remove the cutter guard.
3. Slide the flapper rod from the machine
4. Remove the screw from the tape weight and remove the tape weight from the weighted brush cover.

The weighted brush cover is now removed from the machine. At this point a new weighted brush cover or tape weight may be installed.

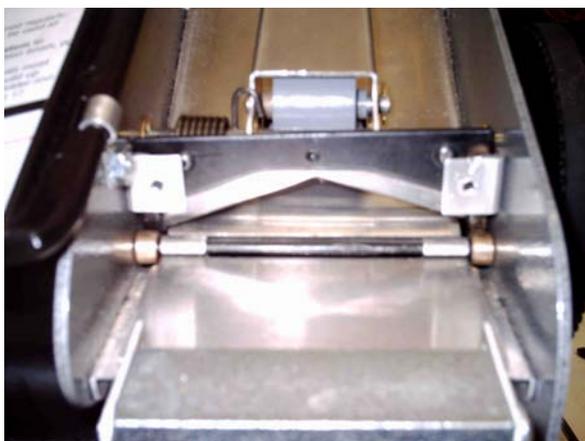
Attaching the Weighted Brush Cover

To attach the weighted brush cover, see Fig 41 and follow the steps below.

1. Position the tape weight into the new weighted brush cover and screw in the screw.
2. Slide one end of the flapper rod into to the chassis.
3. Place a bushing, then the weighted brush cover, then another bushing on the flapper rod and slide the rod through the other side of the chassis.
4. Attach the e-clips to the flapper rod.
5. Attach the cutter guard.
6. Attach the water bottle.

The machine is now ready to continue normal operations

Old Version



Current Version



