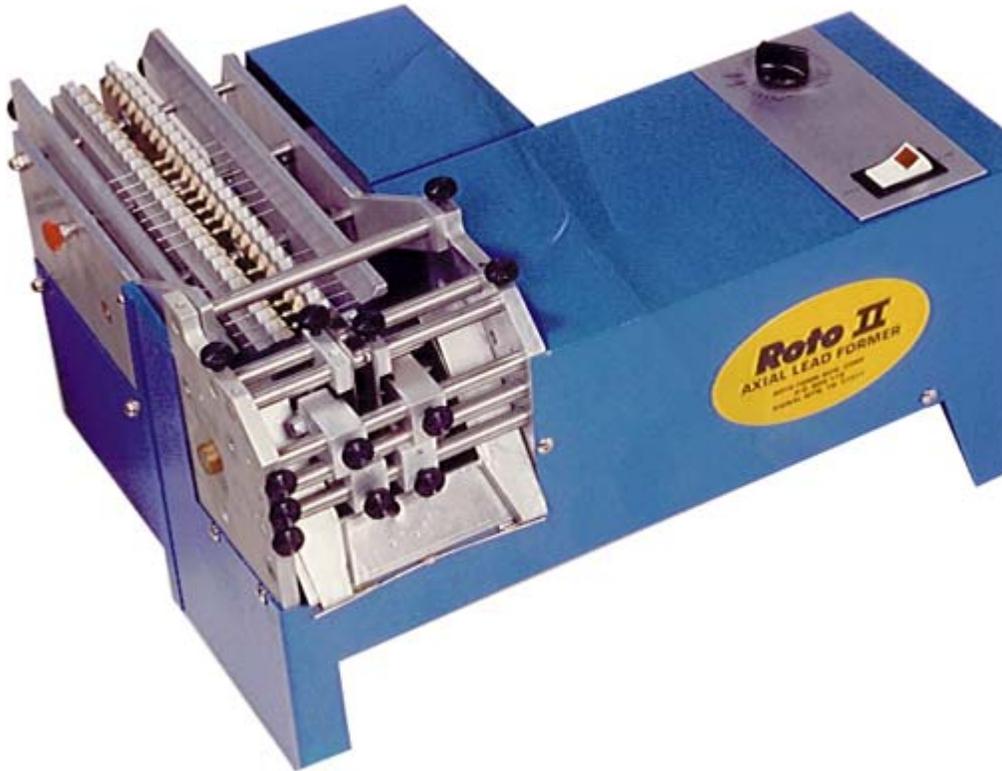


# OWNER'S MANUAL

## ROTO II<sup>®</sup>, MODEL 151



Color has been changed to black and silver

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# I. GENERAL DESCRIPTION

The ROTO II ® is a well designed machine constructed of quality milled 3/8" aluminum bar stock with an enameled cold rolled steel cover. The exposed metals are stainless and anodized aluminum. Cut, form, and chute blocks are milled, anodized aluminum. Every effort has been made to provide all hardened non-corrosive materials to give your ROTO II ® years of life and to preserve its fine appearance.

The ROTO II ® is fitted with a grounded six (6) foot power cord. A solid state continuous speed control regulates the operation circuit and controls the motor speed

The drive motor is a heavy duty, ball bearing, oil impregnated, DC wound armature, brush motor with a rated brush life of over five thousand (5,000) hours at full load. The motor has a sealed gear head effecting a continuous power ratio at the drive shaft of 128 to 1. Connected to the gear head is a coupling, which is keyed to the shaft and pinned completely through. This power train drives the main shaft, which turns the cutting and forming discs. *For diagram, refer to the Engineering Drawing & Parts List.*

The ROTO II ® is capable of forming 45,000 components an hour using the tape feed assembly, and up to 3,000 per hour using the loose parts feeder.

# II. UNPACKING AND SETTING UP THE MACHINE

## Unpacking

Carefully unpack the machine, and inspect to make sure it has not been damaged during shipment. Contact the carrier immediately if any damage is found.

## Setting Up

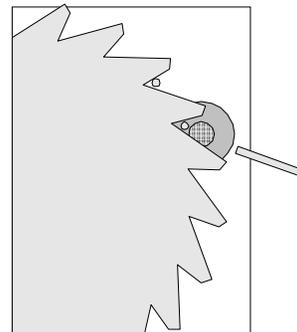
**The ROTO II ® is capable of forming tape and reel components and/or loose parts, by means of the loose parts feeder, available as an option through Roto Form Mfg Corp. Follow the Set-Up section(s) that apply to your application.**

## Description of Tape Feed Assembly

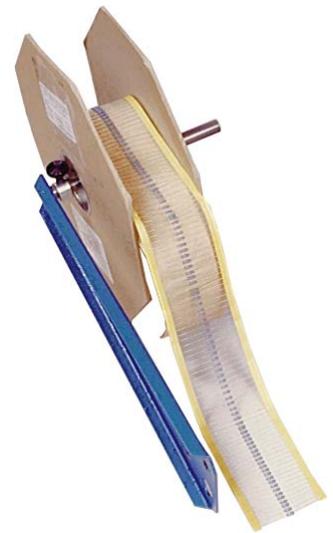
Axial lead components are pulled into the machine by means of four simultaneously rotating toothed discs. Adjustable guides center the body of the components for symmetrical bending, or allow for an off-center body if so desired.

Bending discs, on either side of the feed guides adjust in position allowing you to control the width of formed components to suit your needs. The cutting disks are also adjustable to enable users to determine leg lengths (maximum 1/2").

As the discs rotate forward, leads are cut to the preset lengths on each side of the component. The component is then formed into the goal-post shape as the bending disks pull it past the bending die. Formed components drop and slide out the rear of the machine, while the scrap lead comes out the front.

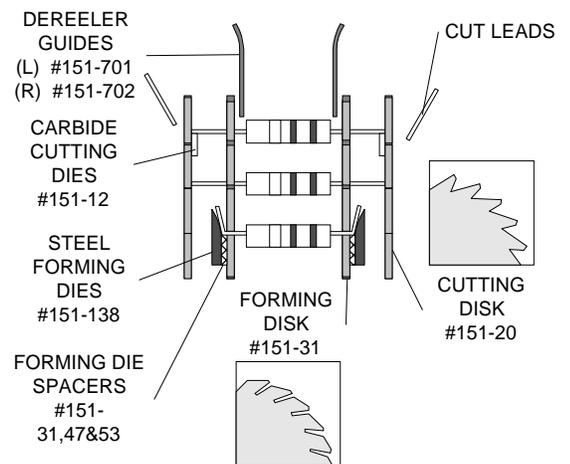


# Installing the Tape Feed Assembly



**The following procedure is extremely important and must be given careful attention to yield desired bend centers and leg lengths on components.**

1. Remove both of the T- bolts and the arm from the machine (1)
2. Loosen the thumbscrews for the cutting and bending blocks (numbered 2, 3, 4, & 5 in the illustration). Facing the front of the machine, move the left cutting block (2) and the left bending block (4) to the left as far as possible. Move the right cutting and bending blocks (3 & 5) to the right approximately 1/2" to allow the tape feed guides room to be positioned between the bending blocks.
3. Install the tape feed guide, lining it up with the thumbscrew holes (1) and the center locating bearing. Insert and tighten the thumbscrews.
4. Loosen the thumb screw (8) (*do not loosen thumbscrew (7)*) and move the guide block right to a position a few thousandths of an inch wider than the component body. Tighten the thumbscrew.
5. Adjust the bending blocks (4 & 5) an equal distance to the left and right of the feed guides (if you want the body of the component centered). Adjust until you arrive at the desired bend center. Tighten bending block thumbscrews (4 & 5).
6. Adjust the cutting blocks (2 & 3) to the desired distance on each side of the bending discs (4 & 5). Tighten all thumbscrews. Run a few components through and inspect for desired dimensions and proper bends. Readjust if necessary.
7. You are now ready to install the tape and reel. Loosen the thumbscrew and remove the outer collar, spring, and hub on the tape feed fixture bar. Slide the reel onto the bar with the tape feeding from the bottom; replace

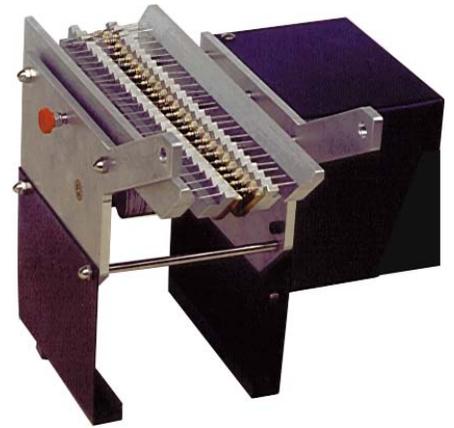


the hub, spring and collar. Center the reel on the bar, and adjust the tension in the hub so that it turns freely, but has no play in it.

8. Feed the tape under the tape guide bar; the highest and rear-most bar on the machine, which has two adjustable collars on it. Adjust the collars on each side of the tape allowing approximately 1/16" play. From there the tape goes directly into the four discs. Turn the speed control knob to the "0" position and flip the ON/OFF switch to ON. The discs will begin rotating and will pull the tape through the machine. Make sure the tape feeds freely passed the bending blocks (4 & 5), it can bunch up underneath them at first. Inspect the components again and readjust if necessary. Once the desired dimensions and bends are achieved, increase the speed to desired production rate (0 – 45,000 per hour).

## Description of Loose Parts Feeder

The all new "walking beam" loose parts feeder (LPF) makes handling those loose parts easy. The LPF is motorized with its own AC type gear motor. It simply attaches to the Model 151 and electrically plugs into the rear of the case. Once installed, the LPF may remain mounted to the Model 151, even when using the tape and reel feeder. Contact Roto Form Mfg Corp for details about using the LPF with your Roto II ®, Model 151.



## Installing the Loose Parts Feeder

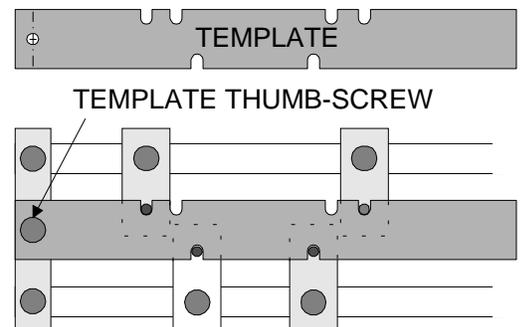
Separate document.

## Using a Template

If you know exactly how long the component legs need to be, and how much distance you need between them, a template could make setting up the machine easier. A template takes the guesswork out of setting the cutting and forming blocks to the right dimensions. However, templates are only available for certain specific configurations.

Each cutting block and each forming block has a 1/8" steel pin slightly protruding out its front side. To use a template:

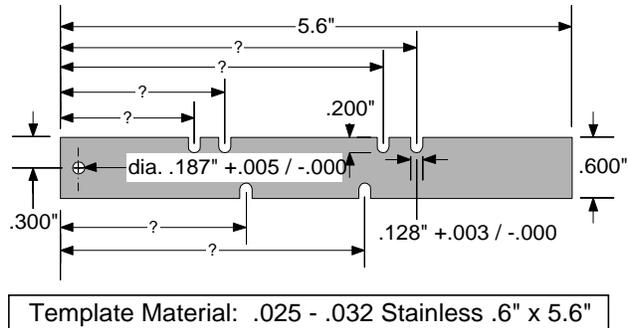
1. Fasten the template loosely under the template thumbscrew (center left) and position each block with its pin protruding into the corresponding slot in the template.
2. Tighten all the thumbscrews. You can leave the template in place, or take it off. Leaving the template on the machine during



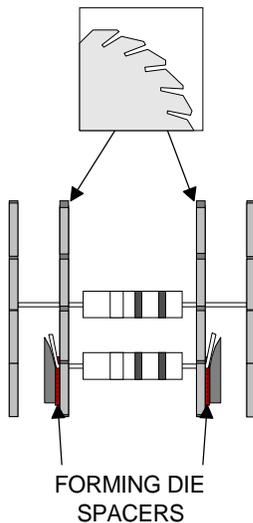
operation will not affect its performance.

## Making a Template

Set the machine by trial and error to the desired bend center and leg length. Tighten the thumbscrews (2, 3, 4, 5, 9, & 10 – see page 5). With a caliper, measure from the outside left frame to the centerline of the protrusions on the blocks (2, 3, 4, & 5) and fill in the print.



The bottom slots establish the bend centers, while the top slots establish the lead lengths. Mark the template with an identification tag.



## Bending Spacers

Components are fed through the machine by rotating toothed discs. Component leads are cut with a circular carbide die. After the ends of the leads are cut, components are forced past the bending dies, establishing the bend locations. Components are then pulled through parallel channels, whose width is controlled by bend spacers. If the width of the bend spacer is precisely that of the lead size of the component, the legs will be parallel. If the spacer is slightly wider than the lead wire, the legs will taper out a little. This taper can be an advantage when assembling boards, because the legs will provide a slight spring tension to hold them in place on the board. If the lead wire is wider than the bend spacer, shearing will occur as they are pulled through, causing unnecessary strain on the disk and forming die.

The machine comes equipped with the following bend spacers:

- 4 - .020"
- 2 - .025"
- 2 - .032"

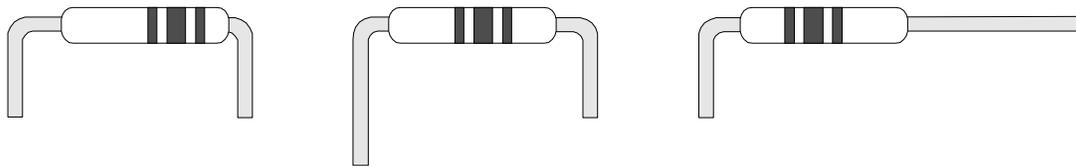
Use them together in the following combinations for the applicable lead size. For optimal performance, change the spacers whenever the lead size varies on the components being formed.

COMPONENT	WIRE DIAMETER	SPACERS
Diodes	.020"	.020" or .025"
¼ watt resistors	.025"	.025" or .032"
½ watt resistors	.032"	.032" or two .020"’s
1 watt resistors	.040"	2-.020"s or 1-.025" and 1- .020"
2 watt resistors	.045"	1-.025" and 1-.020" or 2-.025"s

Use spacers, which are slightly larger than the component lead diameter to taper the legs out slightly so that they hold components to boards during handling and soldering.

## Unusual Component forms

To cut leads (one or both) without forming, remove the bending die(s) from the machine. All dimensions can and must be set independently.



## III. TROUBLE SHOOTING

1. Burrs on cut leads.

*Probable Solution:* Feed disc guides are worn. Switch left to right, or replace.



2. Legs are not parallel:

*Probable Solution:* One side not cutting properly. Check for wear on feed disc guide.

OR

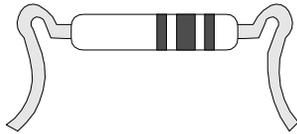
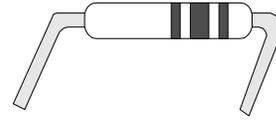
Part not hitting the ejector sheet metal properly. Ejector is located between the bending wheels to the rear of the bending blocks. Readjust set-up to compensate.

OR

The spring on the cutting block should be checked to make sure it is free.

3. Incorrect bends:

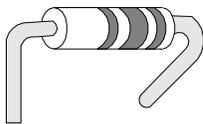
*Probable Solution:* Components are not located in the proper teeth in the cutting and bending discs.



*Probable Solution:* Cutting dies are rotating. Disassemble the cutting blocks; make sure the springs are mounted properly to prevent the dies from rotating.

*Probable Solution:* Tin is building up on the bending dies. Inspect for this periodically.

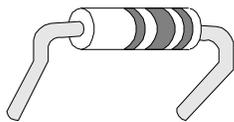
Bending dies are useful for approximately 80,000 – 160,000 bends per edge. When excessive wear or tin build-up is evident, turn the bend die 180° to a fresh edge. When this occurs again, swap the left and right dies. Another 180° turn makes for four fresh edges per die, and a total of 320,000 to 640,000 bends per set of dies.



*Probable Solution:* When a skew takes place, there is wear or an obstruction on one bending die only.

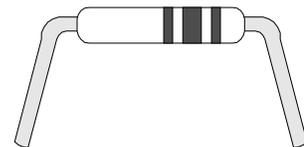
OR

There is a component lead caught behind the retainer clip on one of the bending blocks.



*Probable Solution:* When leads are parallel from front view, but curved from end view, the lead lengths are cut too long. Maximum lead length is 1/2".

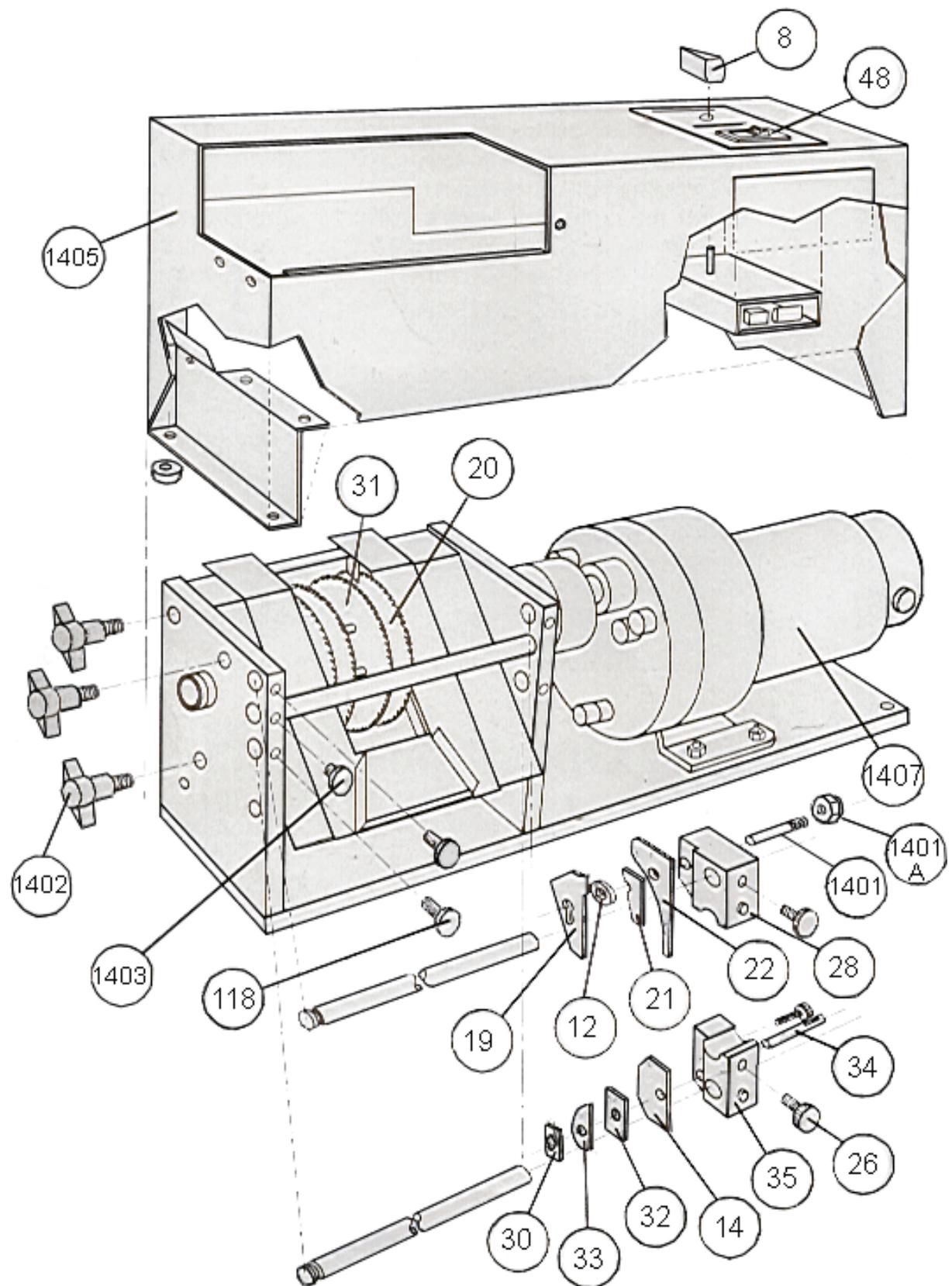
*Probable Solution:* Lead legs are not parallel. This occurs when cutting very short lead lengths on heavy wire due to excessive wear on the bending die or the retainer clip, or the wrong size spacer. Inspect, rotate, or replace.



## IV. SPECIFICATIONS

<b>Wire Sizes</b>	<b>0.015" – 0.045" dia</b>
<b>Center to Center distances</b>	<b>0.300" – 0.800"</b>
<b>Body diameter</b>	<b>0.0200" – 0.875"</b>
<b>Body length</b>	<b>0.125" – 1.250"</b>
<b>Electrical requirements</b>	<b>120VAC standard 240 VAC optional</b>
<b>Speed (tape and reel)</b>	<b>Variable up to 45,000 parts per hour</b>
<b>Speed (loose parts)LPF</b>	<b>Variable up to 3,000 parts per hour</b>

# V. ILLUSTRATED PARTS LIST



# PARTS LIST

151-7	Power Supply
151-8	Speed Control Knob
151-12	Carbide Cutting Die
151-13	Sleeve – Cutting Disc
151-14	Forming Die – G7
151-15	Sleeve – Forming Disc
151-16	Driver Clips
151-18	Cutting Block, Left
151-19	Lead Guide
151-20	Cutting Dies
151-21	Cutting Feed Disc Spacer
151-22	Cutting Feed Disc Guide
151-23	Template, Lead Sizing (made to order)
151-26	Knurled Screw, 3/8", Black
151-28	Cutting Block, Right
151-29	Forming Block, Left
151-30	Forming Feed disc Guide
151-31	Forming discs
151-32	Forming Die Spacer (.020")
151-33	Forming Feed Disc Spacer
151-34	Forming Assembly Pin
151-35	Forming Block, Right
151-47	Forming Die Spacer (.025")
151-48	On/Off Switch
151-53	Forming Die Spacer (.032")
151-111	Guide Mounting Block Dereeler, Left
151-112	Guide Mounting Block Dereeler, Right
151-116	Large Retaining Ring, for Cutting and Forming Discs
151-117	Small Retaining Ring, for Sleeves
151-118	Knurled Screw, 3/8", Red
151-135	Knurled Screw, 1/2", Red
151-138	Forming Die, Steel (optional)
151-701	Dereeler Guide, Left
151-702	Dereeler Guide, Right
151-1401	Cutting Assembly Pin, Retaining Ring & Spring Assembly
151-1402	T-Bolts
151-1403	Knurled Screw For Template
151-1404	Card Feed Assembly
151-1405	Cabinet with Nameplates
151-1406	Dereeler Assembly
151-1407	Motor with Gear, with Coupling, with Spider

## VI. MAINTENANCE

After cutting and forming approximately 150,000 components, simply fill an oil can with a flex spout with whatever solvent you use to clean your circuit boards. With the machine running, wash it down thoroughly with the solvent. When the solvent evaporates, spray the machine with a light oil (e.g. LPS-1, etc.). A clean machine will provide longer performance.

### Tool Changes

Loosen all thumbscrews on the front of the machine (2, 3, 4, 5, 9, & 10 – see page 5). Slide the top bar holding the cutting blocks to the left. Remove the cutting blocks for tool changes. Slide the bottom bar holding the bending blocks to the left. Remove the bending blocks for tool changes.

#### CAUTION

Check your parts frequently to be sure everything is functioning properly.

## VII. WARRANTY AND REPAIRS

### Warranty:

The Roto II is warranted to be free of defects in material and workmanship for a period of 12 months after delivery to the first purchaser for use, providing that the unit has not been misapplied. Since Roto Form has no control over its use, and sometimes misuse, we cannot guarantee against failure. Roto Form's obligations hereunder, at Roto Form's option, are limited to replacement or repair of parts, which upon examination prove to be defective within the warranty period specified. This warranty does not apply to damage resulting from transportation, alteration, misuse, or abuse.