

CF-8  
Axial Component Lead Former

**Operating Instructions**

Version 2.2  
April 2, 2007

Copyright (C) 2007 GPD Global®  
All Rights Reserved

**GPD Global®**

611 Hollingsworth Street  
P.O. Box 3836  
Grand Junction, CO 81502  
(970) 245-0408  
FAX: (970) 245-9674



## NOTE:

This document applies to these machine models:

- **CF-8** Precision Axial Component Lead Former
- **CF-15** Precision Axial Component Lead Former

The following exceptions apply when using this document for the **CF-15**:

1. Ignore all references to Stations 4 & 5 (they are not present on the CF-15).
2. Roller or dimpling dies are not applicable.
3. No crimping on the component leads is performed.

## Warranty

GPD Global® (GPD) warrants that this product will be free from defects in material and workmanship for a period of one (1) year from the date of original purchase. GPD will repair, or at its option, replace this GPD Product during the warranty period at no charge, provided it is returned (shipping-postage paid) to the GPD, Colorado service facility.

The one year warranty does not cover normal wear and tear to the cutting and forming tooling, since life usually depends on use.

This warranty does not apply if the GPD product has been damaged by accident, abuse, misuse, or misapplication, has been modified without the written permission of GPD, or if any GPD serial number has been removed or defaced.

GPD IS NOT RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM THE BREACH OF ANY EXPRESS OR IMPLIED WARRANTY INCLUDING ANY COSTS OF DAMAGE TO PROPERTY, AND, TO THE EXTENT PERMITTED BY LAW, DAMAGES FOR PERSONAL INJURY. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES. ANY IMPLIED WARRANTIES, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO ONE (1) YEAR FROM THE DATE OF RECEIPT OF THIS PRODUCT. GPD'S LIABILITY ON ANY CLAIM OF ANY KIND INCLUDING NEGLIGENCE, FOR LOSS OR DAMAGE ARISING OUT OF, CONNECTED WITH OR RESULTING FROM THE BREACH OF ANY EXPRESS OR IMPLIED WARRANTY OR THE DELIVERY, REPAIR, OR USE OF ANY GPD PRODUCT SHALL IN NO CASE EXCEED THE PRICE ALLOCABLE TO THE GPD PRODUCT WHICH GIVES RISE TO THE CLAIM.

Specifications, descriptions, and all information contained in this manual are subject to change and/or correction without notice.

## Revisions

Version 1.0 release. All undated pages.

Version 2.0 release. All pages dated 12/01/90.

Version 2.1 release. All pages dated 08/30/91.

Version 2.2 release. All pages dated 04/02/07.

## Table of Contents

1.0	<u>Introduction</u> .....	1-1
2.0	<u>Part Identification &amp; Specifications</u> .....	2-1
2.1	Part Identification .....	2-1
2.1.1	Front View .....	2-1
2.1.2	Rear View .....	2-2
2.1.3	Left View .....	2-3
2.1.4	Right View .....	2-4
2.1.5	Cutting & Forming Dies .....	2-5
2.1.6	Safety Guards .....	2-6
2.2	Specifications .....	2-7
2.2.1	Power Requirements .....	2-7
2.2.2	Measurements .....	2-7
2.2.3	Production Rates .....	2-7
2.2.4	Processing Ranges .....	2-8
3.0	<u>Safety Instructions</u> .....	3-1
4.0	<u>Installation Procedure</u> .....	4-1
4.1	Accessories .....	4-1
4.2	Accessory Installation .....	4-2
4.3	Footswitch Installation .....	4-3
5.0	<u>Set-Up Procedure</u> .....	5-1
5.1	Operations & Functions Summary .....	5-1
5.1.1	Method of Operations .....	5-1
5.1.2	Station Function Summary .....	5-2
5.2	Initial Set-Up .....	5-3
5.3	Select & Install CF-8 Hardware .....	5-5
5.3.1	Select Dies .....	5-5
5.3.2	Calculate Station Settings .....	5-8
5.3.2.1	Horizontal Flush-Mount Form Calculations .....	5-9
5.3.2.2	Horizontal Stand-Off Form Calculations .....	5-10
5.3.2.3	Vertical Flush-Mount Form Calculations .....	5-11
5.3.2.4	Vertical Stand-Off Form Calculations .....	5-12
5.3.3	Observe Processing Limits .....	5-14
5.3.4	Install Dies .....	5-16
5.3.5	Select & Install Transport Wheel Pair & Component Ejector Blade .....	5-19
5.3.6	Install or Remove Dual Infeed Chute Shims .....	5-21

5.4	Adjust Stations	5-22
5.4.1	Adjust Stations 2 & 3	5-22
5.4.2	Adjust Stations 4 & 5	5-22
5.4.3	Adjust Stations 6 & 7	5-22
5.4.4	Adjust Stations 8 & 9	5-22
5.4.5	Adjust Station 1	5-24
5.5	Form Sample Components	5-25
5.6	Install Taped Components	5-26
5.7	Install Optional Feeders	5-27
5.8	Set-Up Adjustments Summary	5-28
6.0	<u>Operating Instructions</u>	6-1
6.1	Power On	6-1
6.2	Operating Instructions	6-1
6.3	Power Off	6-1
7.0	<u>Options</u>	7-1
7.1	Bulkfeeder & Cardfeeder Set-Up	7-1
7.1.1	Feeder Identification & Processing Ranges	7-1
7.1.2	Bulkfeeder Measurements	7-3
7.1.3	Cardfeeder Measurements	7-3
7.1.4	Check Pick-Up Disk Timing	7-4
7.1.5	Install Feeder	7-6
7.1.6	Adjust Feeder For Component Body Lengths	7-7
7.1.7	Identify Component Misfeeding Problems	7-8
7.2	Install Hopper & Arm Assembly	7-9
7.2.1	Install Hopper	7-9
7.2.2	Adjust Hopper	7-9
8.0	<u>Preventive Maintenance</u>	8-1
8.1	Preventive Maintenance Schedule	8-1
8.2	Preventive Maintenance Steps	8-2
8.3	Quick Reference Illustrated Guide	8-4
9.0	<u>Troubleshooting</u>	9-1
9.1	Machine Not Rotating Properly	9-1
9.2	Machine Rotating Noisily	9-2
9.3	Components Fall Out of Machine	9-3
9.4	Components Not Forming Properly	9-4
9.4.1	Illustrated Guide	9-4
10.0	<u>Suggested Spare Parts Kits</u>	10-1

Appendix A	<u>Electrical Diagram &amp; Schematics</u> .....	A-1
------------	--	-----

Index .....	I-1
-------------	-----

#### References

CF-8 Bills of Material with Exploded View Drawings (P/N 801-1-05)
CF-8 Component Forming Dies Catalog (P/N 800-000)
CF-8 Setup Sheet (P/N 850-003)
Transport Wheel Maintenance Procedure (P/N 817-1-18)

### Table Of Charts

Chart 1	Taped Components Processing Ranges .....	2-8
Chart 2	Card & Bulk Components Processing Ranges .....	2-8
Chart 3	Vertical Components Processing Ranges .....	2-9
Chart 4	Horizontal Die Processing Ranges .....	5-7
Chart 5	Pin Die Processing Ranges .....	5-7
Chart 6	Horizontal Flush-Mount Form Calculations/Settings .....	5-9
Chart 7	Horizontal Stand-Off Die Dimension Variable Values .....	5-10
Chart 8	Horizontal Stand-Off Form Calculations/Settings .....	5-10
Chart 9	Vertical Flush-Mount Form Calculations/Settings .....	5-11
Chart 10	Vertical Stand-Off Die Dimension Variable Values .....	5-12
Chart 11	Vertical Stand-Off Form Calculations/Settings .....	5-13
Chart 12	CF-8 Processing Limits .....	5-14
Chart 13	CF-8 Component Dimension Processing Limits .....	5-15
Chart 14	Transport Wheel Selection .....	5-19
Chart 15	Set-Up Steps Quick Reference Guide .....	5-28
Chart 16	Optional Feeder Identification .....	7-2
Chart 17	Component Misfeeding References .....	7-8
Chart 18	Preventive Maintenance Schedule .....	8-1
Chart 19	Troubleshooting -- Machine Not Rotating Properly .....	9-1
Chart 20	Troubleshooting -- Machine Rotating Noisily .....	9-2
Chart 21	Troubleshooting -- Components Fall Out of Machine .....	9-3
Chart 22	Troubleshooting -- Components Not Forming Properly .....	9-4

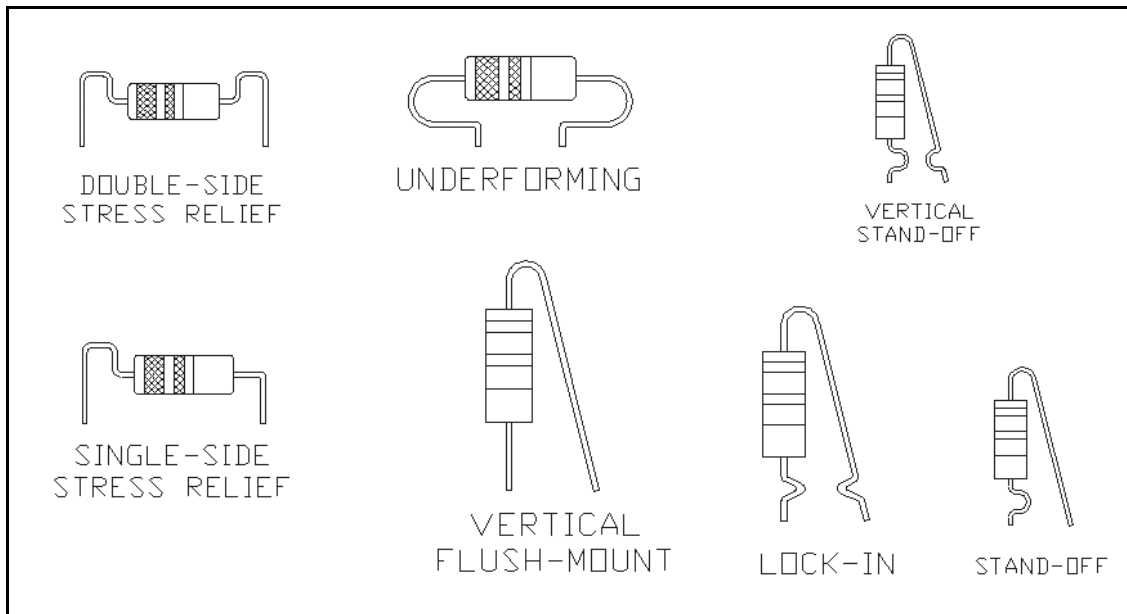
## Table of Figures

Figure 1	Axial Component Forms . . . . .	1-1
Figure 2	Front View, Part Identification . . . . .	2-1
Figure 3	Rear View, Part Identification . . . . .	2-2
Figure 4	Left View, Part Identification . . . . .	2-3
Figure 5	Right View, Part Identification . . . . .	2-4
Figure 6	Cutting & Forming Dies, Part Identification . . . . .	2-5
Figure 7	CF-8 Safety Guards, Part Identification . . . . .	2-6
Figure 8	Component Elements . . . . .	2-8
Figure 9	Vertical Component Elements . . . . .	2-9
Figure 10	CF-8 Front View, Installation . . . . .	4-2
Figure 11	CF-8 Safety Guard, Installation . . . . .	4-2
Figure 12	CF-8 Rear View, Footswitch Operation . . . . .	4-3
Figure 13	CF-8 Operation Sequence . . . . .	5-1
Figure 14	Component Elements . . . . .	5-2
Figure 15	CF-8 Left View, Ejector Blade & Transport Wheel Removal . . . . .	5-4
Figure 16	Stations 4 & 5 Die Selection . . . . .	5-6
Figure 17	Die Identification . . . . .	5-7
Figure 18	Stations 4 & 5 Die Markings . . . . .	5-16
Figure 19	Dimpling Die Installation, Front View . . . . .	5-16
Figure 20	Secondary Cut-Off Die Installation, Front View . . . . .	5-17
Figure 21	Stations 6 & 7 Die Markings . . . . .	5-17
Figure 22	Stations 6 & 7 Die Installation, Front View . . . . .	5-18
Figure 23	Transport Wheel Timing . . . . .	5-19
Figure 24	Transport Wheel Installation, Left View . . . . .	5-20
Figure 25	Infeed Chute, Top View, Shim Installation . . . . .	5-21
Figure 26	Stations 8 & 9 Settings . . . . .	5-23
Figure 27	Top View, Station 1 Adjustment, Infeed Chute . . . . .	5-24
Figure 28	CF-8 Taped Components Installation . . . . .	5-26
Figure 29	Infeed Chute, Top View, Component Centering . . . . .	5-26
Figure 30	Infeed Chute, Top View, Removal . . . . .	5-27
Figure 31	Rear Feeder Half, Inside View, Feeder Identification . . . . .	7-2
Figure 32	Pick-Up Disk Timing . . . . .	7-4
Figure 33	Rear Feeder Half, Top View, Disk Timing . . . . .	7-4
Figure 34	Pick-up Disk Rotation Direction . . . . .	7-5
Figure 35	Rear Feeder Half, Inside View, Disk Timing . . . . .	7-5
Figure 36	Component Feeder, Left View, Mounting . . . . .	7-6
Figure 37	Rear Feeder Half, Top View, Mounting . . . . .	7-6
Figure 38	Component Feeder, Top View, Body Length Adjustment . . . . .	7-7
Figure 39	Optional Bulkfeeder Hopper . . . . .	7-9

Figure 40	Station 1 Oiling Locations, Top View, Dual Infeed Chutes Removed . . . . .	8-4
Figure 41	Stations 2 & 3 Oiling Locations, Top View . . . . .	8-4
Figure 42	Stations 4 & 5 Oiling Locations, Front View . . . . .	8-4
Figure 43	Stations 6, 7, 8, & 9 Oiling Locations, Front View . . . . .	8-5
Figure 44	Stations 8 & 9 Oiling Locations, Adjusting Collars, Front View . . . . .	8-5

## 1.0 Introduction

The CF-8 Precision Axial Lead Former is designed to efficiently cut and form leads of axial electrical components up to a maximum rate of 25,000 parts per hour. Components are fed into the machine and then the component's leads are trimmed by carbide cutting blades, and crimped and/or cut in a manner that avoids stress on the leads. The leads are then formed into horizontal or vertical bends. The figure below illustrates the most common axial component forms that can be produced with the CF-8. Precision machined dies are quickly changed to make the different forms.



**Figure 1** Axial Component Forms

Standard equipment includes an internal variable speed motor, power supply, and a dual component feeder to process both taped and single-fed bulk components. An optional component bulkfeeder or cardfeeder is also available.

**Before operating the CF-8, read this *Operating Instructions* manual for safety precautions for the safety of both the operator and the machine.**

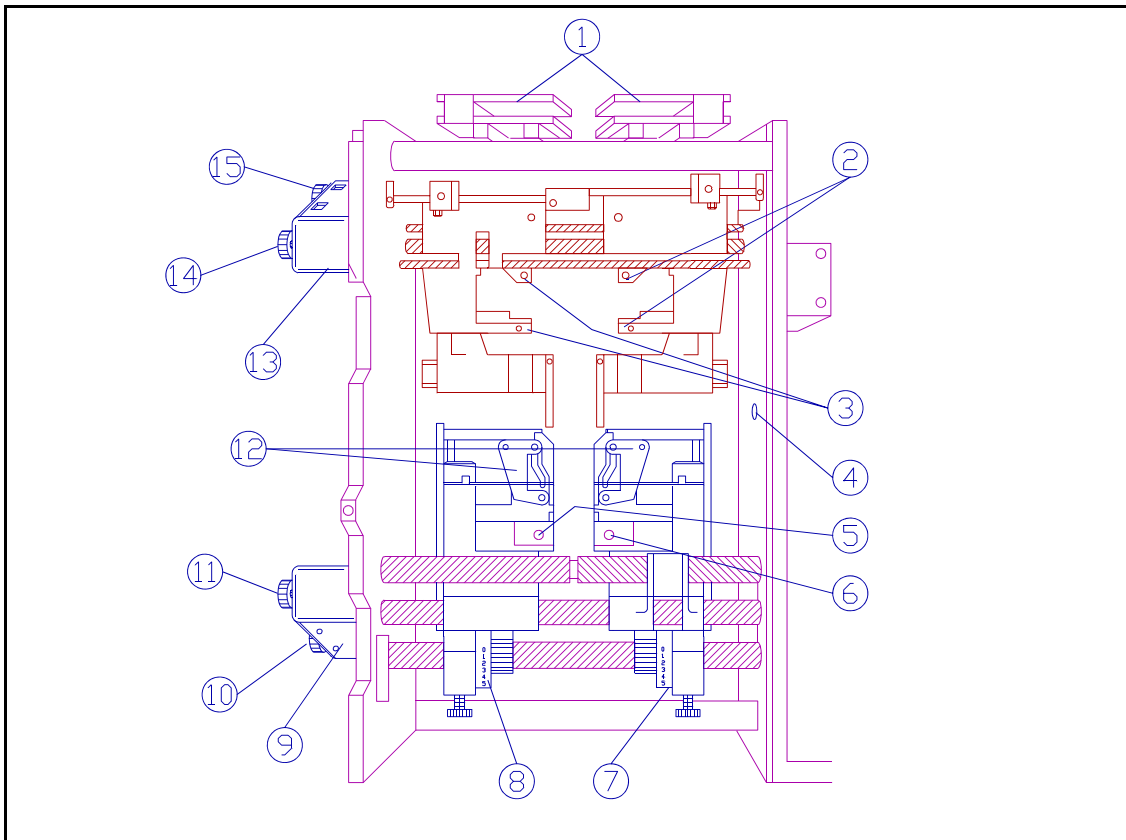
## 2.0 Part Identification & Specifications

### 2.1 Part Identification

The key parts of the CF-8 are identified and illustrated in this section.

#### 2.1.1 Front View

The illustration below identifies the basic operator regulated parts (clockwise from the top) of the CF-8 as seen from the front view.

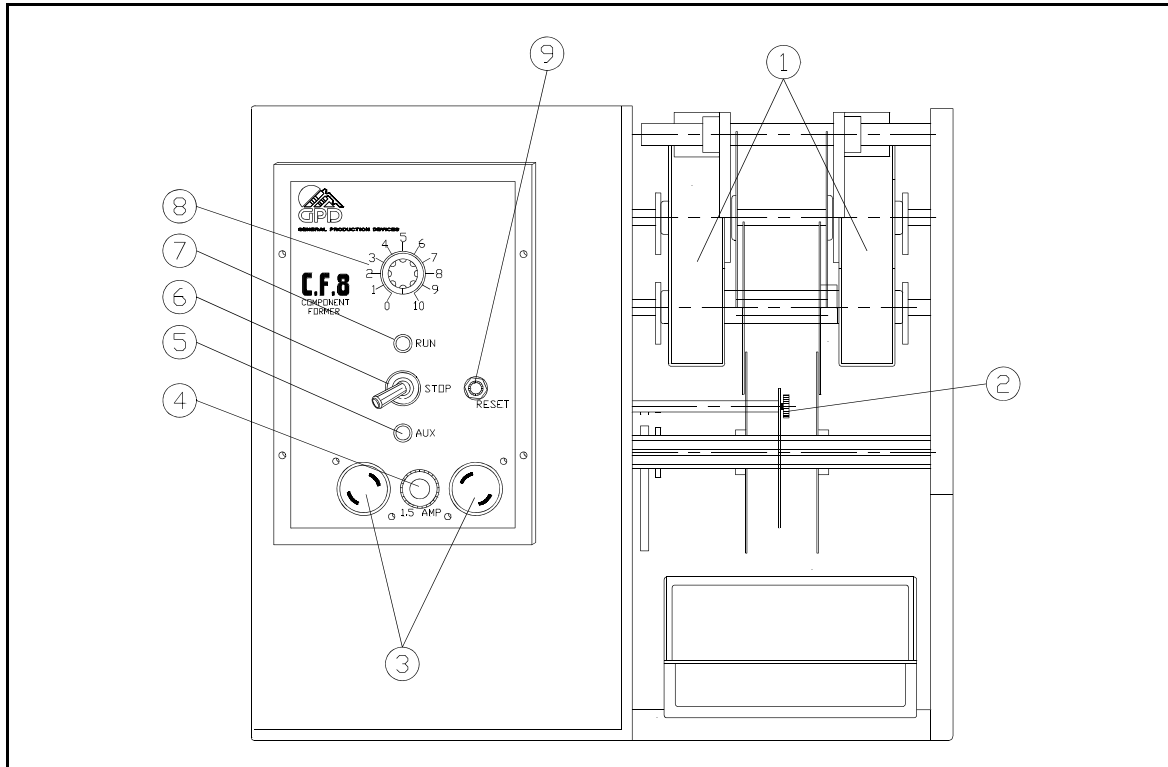


**Figure 2** Front View, Part Identification

Item 1	Dual Infeed Chutes	Item 9	Stations 6 & 7 Counter Box
Item 2	Station 4 Die Holder (top & bottom)	Item 10	Station 7 Adjustment Knob
Item 3	Station 5 Die Holder (top & bottom)	Item 11	Station 6 Adjustment Knob
Item 4	Safety Switch	Item 12	Stations 6 & 7 Roller Assemblies
Item 5	Station 7 Die Holder	Item 13	Stations 4 & 5 Counter Box
Item 6	Station 6 Die Holder	Item 14	Station 5 Adjustment Knob
Item 7	Station 8 Rollover Adjustment	Item 15	Station 4 Adjustment Knob
Item 8	Station 9 Rollover Adjustment		

### 2.1.2 Rear View

The illustration below identifies the basic operator regulated parts (clockwise from the top) of the CF-8 as seen from the rear view.

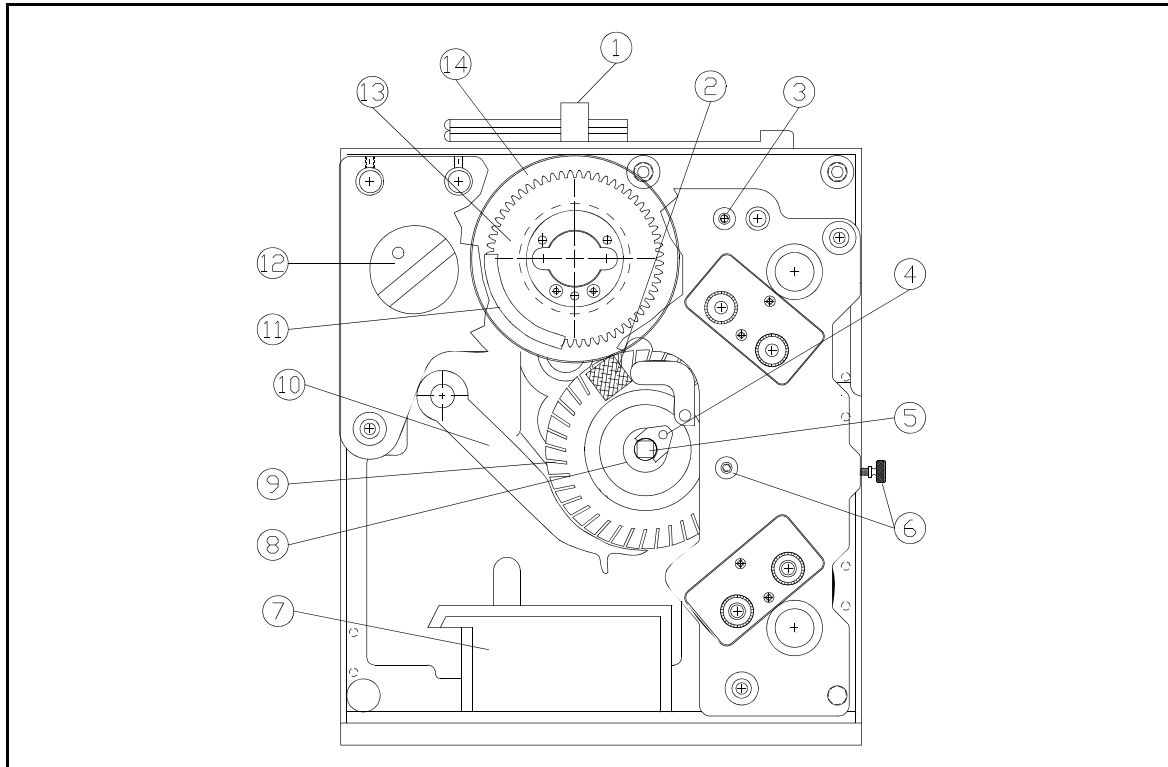


**Figure 3** Rear View, Part Identification

Item 1	Exit Chutes	Item 6	Toggle Switch
Item 2	Ejector Blade Thumbscrew	Item 7	Run Mode Indicator Light
Item 3	Auxiliary Outlets	Item 8	Speed Control Knob
Item 4	Fuse Holder	Item 9	Reset Button
Item 5	Auxiliary Mode Indicator Light		

### 2.1.3 Left View

The illustration below identifies the basic operator regulated parts (clockwise from the top) of the CF-8 as seen from the left view.



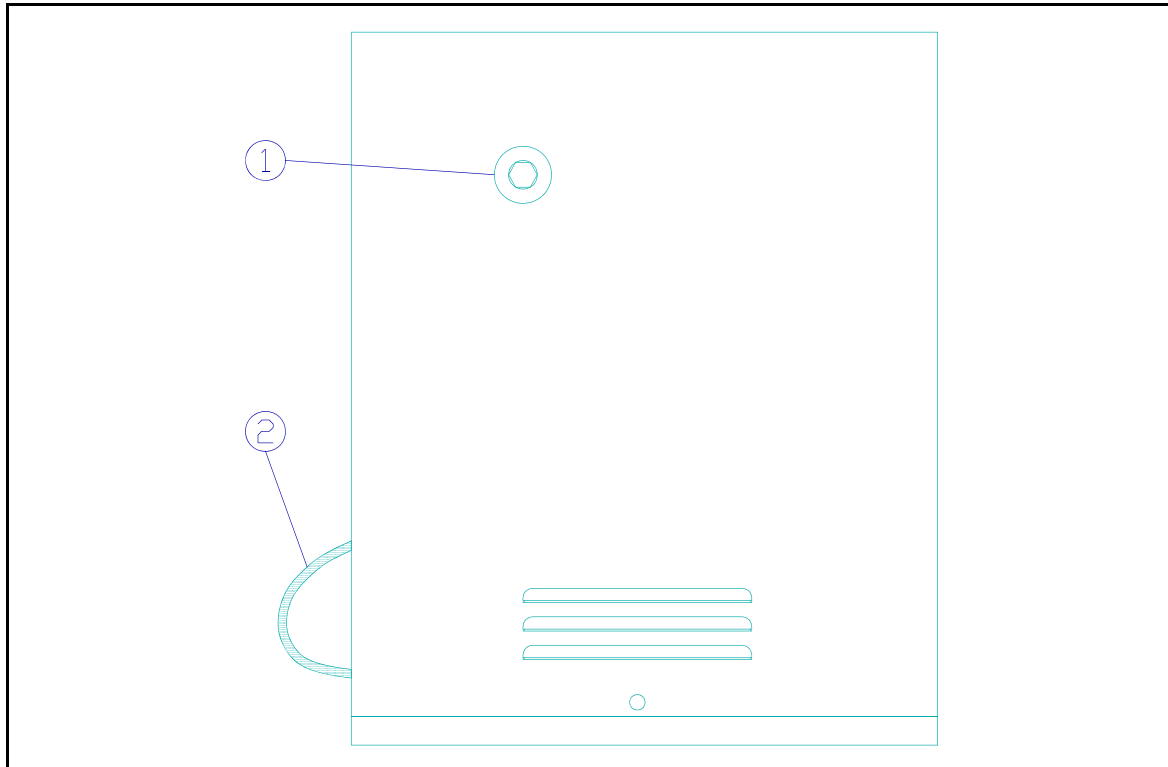
**Figure 4** Left View, Part Identification

Item 1	Infeed Chute Plug	Item 8	Transport Wheel Hub
Item 2	Magnet Assembly	Item 9	Transport Wheel Shim
Item 3	Station 1 Adjustment Knob	Item 10	Component Ejector Blade
Item 4	Transport Wheel Hub Guide	Item 11	Sideplate Assembly
Item 5	Transport Wheel Square Shaft	Item 12	Safety Switch
Item 6	Safety Guards Locking Knobs	Item 13	Cutting Wheel Pair
Item 7	Component Bin	Item 14	Stations 2 & 3 Counter Box

**Note:** Items 11 and 13, the sideplate assembly and the cutting wheel pair, are shown in a cutaway. This is done for identification purposes only and is not meant to reflect the actual appearance of the CF-8.

### 2.1.4 Right View

The illustration below identifies the basic operator regulated parts of the CF-8 as seen from the right view.

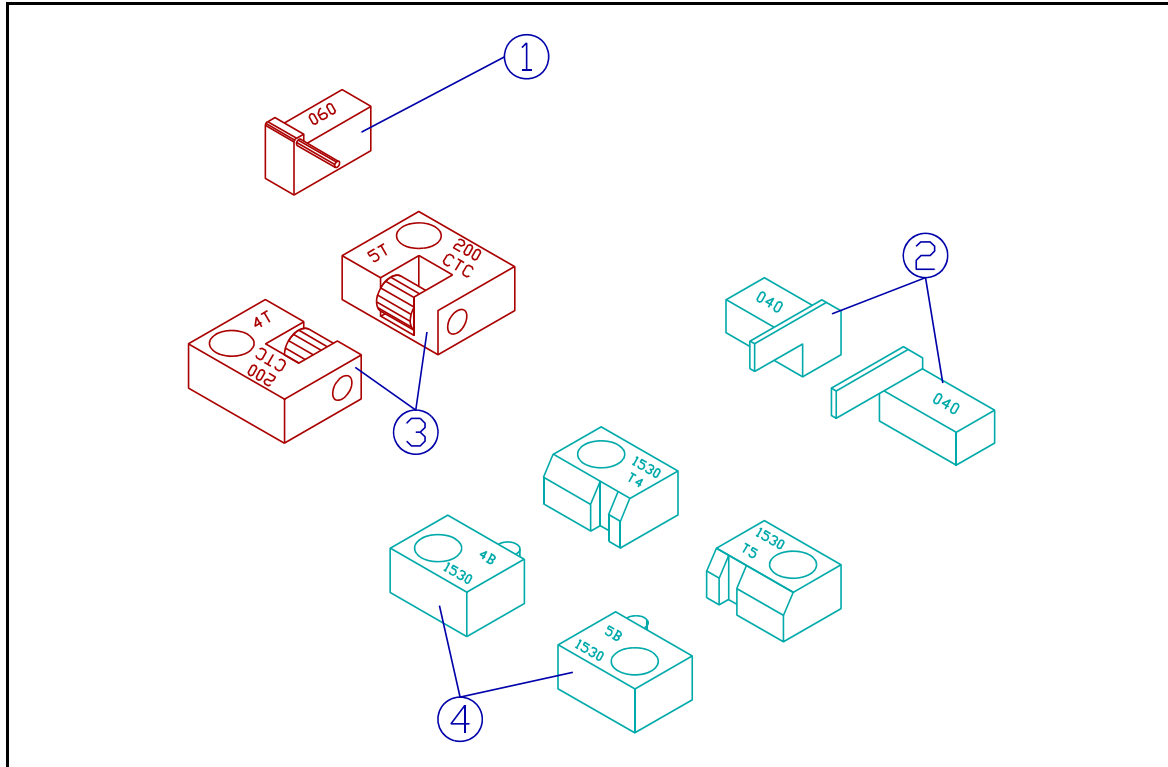


**Figure 5** Right View, Part Identification

- Item 1    Manual Hex Indexing
- Item 2    Power Cord

**2.1.5 Cutting & Forming Dies**

The figure below illustrates examples of standard GPD cutting and forming dies.



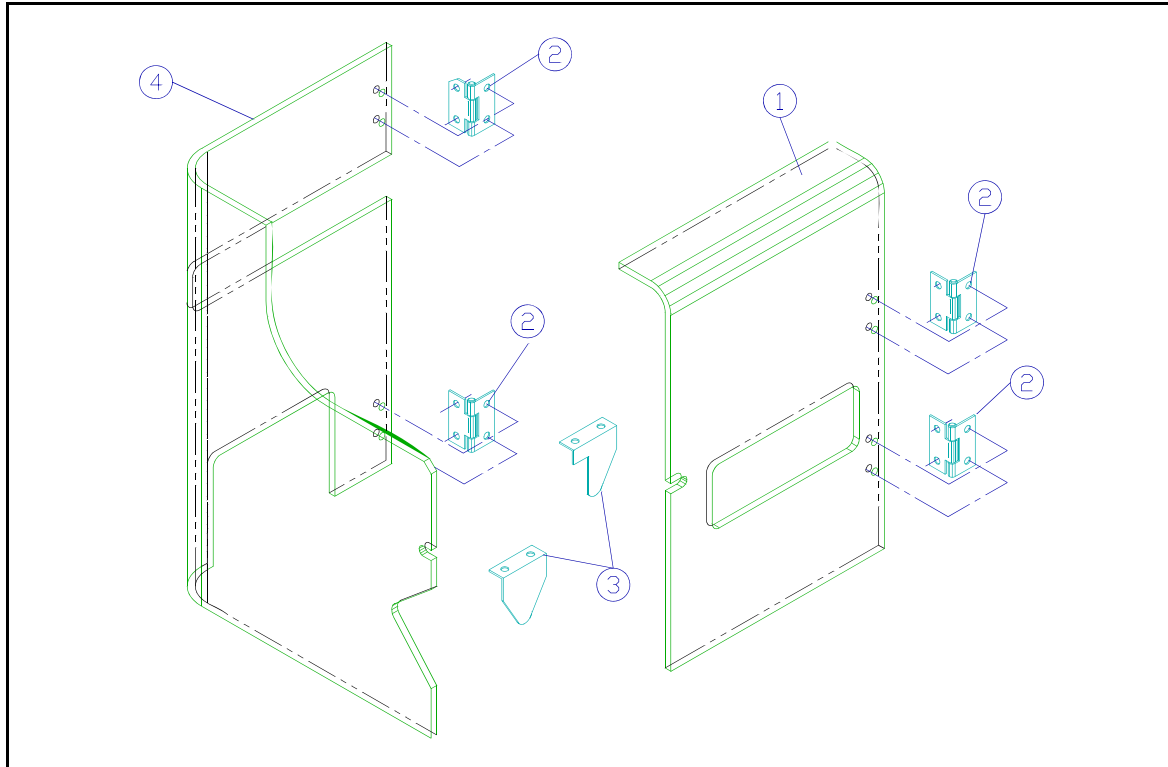
**Figure 6** Cutting & Forming Dies, Part Identification

In the figure above:

	<b>Die Type</b>	<b>Component Forming Use</b>	<b>Station Location</b>
Item 1	Pin	Vertical	6 or 7
Item 2	Horizontal	Flush-mount	6 & 7
Item 3	Roller	Flush-mount	4 & 5
Item 4	Dimpling	Stand-off	4 & 5

### 2.1.6 Safety Guards

The illustration below identifies the Safety Guards.



**Figure 7** CF-8 Safety Guards, Part Identification

- Item 1 Front Safety Guard
- Item 2 Hinges
- Item 3 Microswitch Brackets
- Item 4 Rear Safety Guard

## 2.2 Specifications

### 2.2.1 Power Requirements

#### 100 V Model

Voltage	100 V
Frequency	50/60 Hz
Current 3	Amp

#### 120 V Model

Voltage	120 V
Frequency	50/60 Hz
Current 3	Amp

#### 230 V Model

Voltage	230 V
Frequency	50/60 Hz
Current 1	Amp

### 2.2.2 Measurements

Height	14.0"	(356 mm)
Length	12.0"	(305 mm)
Width	18.0"	(457 mm)
Weight--Actual	96.0 lbs	(43.6 kg)
Weight--Shipping	102.0 lbs	(46.3 kg)

### 2.2.3 Production Rates (maximum number of components per hour)

Tape-mounted	25,000
Card-mounted	6,000
Bulk-fed	4,000

2.2.4 Processing Ranges

Figure 8 and Figure 9 below illustrate various component elements. The CF-8 is capable of processing these elements within the ranges specified in the charts below. Ranges are specified for taped, card, and bulk components.

In the figure and charts below:

- BD = Body Diameter
- BL = Body Length
- CTC = Center to Center
- LL = Leg Length
- WD = Wire Diameter
- WL = Wire Length

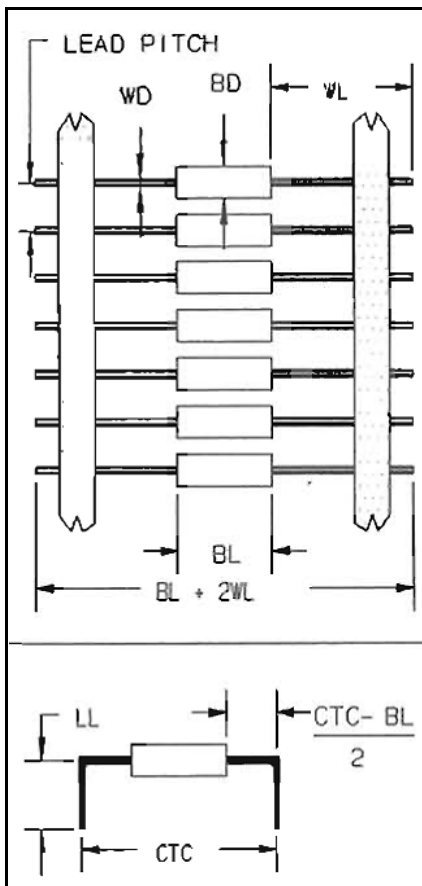


Figure 8 Component Elements  
Lead Pitch = .2", .4"  
(5mm, 10mm)

Taped Components				
Dimension	Inches		Metric (mm)	
	Min.	Max.	Min.	Max.
BD	0.050	0.750	1.3	19.1
BL	0.135	2.000	3.4	50.8
BL+2WL	1.500	BL+3.90	38.1	BL+99.06
CTC	*	2.400	*	61.0
(CTC-BL)÷2	0.040	**	1.0	**
LL	0.140	1.600	3.6	40.6
WD	0.015	0.060	0.4	1.5

Chart 1 Taped Components Processing Ranges

\* Minimum CTC is dependent on the type of die used and the type of component being processed.

\*\* Maximum = (2.4 - BL) ÷ 2 or (61mm - BL) ÷ 2.

Card & Bulk Components				
(same specs as taped except the following)				
Dimension	Inches		Metric (mm)	
	Min.	Max.	Min.	Max.
BL	0.135	2.300	3.4	58.4
BL+2WL	1.000	4.500	25.4	114.3
WD	0.015	0.052	0.4	1.3
BD	0.050	0.350	1.3	8.9

Chart 2 Card & Bulk Components Processing Ranges

**2.2.4 Processing Ranges (continued)**

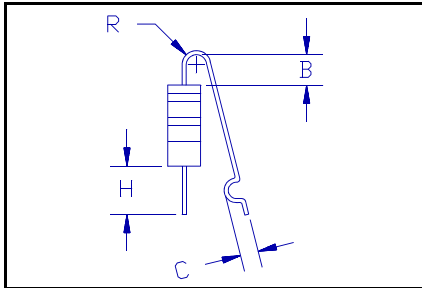
In the figure and chart below:

B = Body to Bend

H = Height of Leg

C = Crimp Height

R = Bend Radius



**Figure 9** Vertical Component Elements

Vertical Components				
Dimension	Inches		Metric (mm)	
	Minimum	Maximum	Minimum	Maximum
B	0.070	---	1.8	---
C	0.045	0.065	1.1	1.7
H	0.180	---	4.6	---
R	0.020	0.050	0.5	1.3

**Chart 3** Vertical Components Processing Ranges

## 3.0 Safety Instructions

### **Read Instructions**

Read this manual before turning the power on.

### **Danger - Machine Operation**

**Keep fingers, clothing, and foreign objects away from wheels and spindles while machine is operating--failure to do so may result in bodily injury or damage to the machine.**

### **Warning - Machine Adjustments**

Read and follow the instructions in *5.0 Set-Up Procedure* before performing adjustments to the CF-8. Adjustments performed out of order can damage the machine.

### **Warning - Machine Parts Removal**

Do not disassemble or remove parts of the CF-8. Read this instruction manual to identify which parts of the machine may be removed.

### **Caution - Operator Safety**

Two plastic safety guards are provided to attach to the front and rear of the CF-8. The guards protect the operator from the moving parts of the machine while in operation. When closed, the guard's microswitch brackets depress safety switches, allowing the machine to operate. Do not defeat the safety switches and operate the machine without the guards in place.

The CF-8 should not be operated with the cover off the right side of the machine due to the danger that exists of electric shock or getting entangled with the belts, pulleys, and cams that drive the machine.

### **Caution - Power Supply**

Make sure the power supplied to the CF-8 is the proper voltage and is fused at the proper amps. This information is on the rear of the machine next to the power cord and in section *2.2.1 Power Requirements*. Do not defeat the earth ground connection of the power cord.

## 4.0 Installation Procedure

Carefully unpack and check the machine for possible shipping damage. If any obvious damage is observed, contact the GPD service department prior to operating the machine. See cover page of this document for phone number and address.

## 4.1 Accessories

Listed below are the minimum accessories included with the CF-8. Part numbers listed to the right are included as an aid when necessary to re-order a particular item.

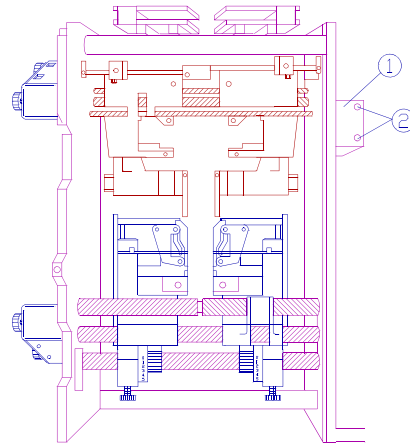
<u>Accessory Item</u>	<u>Part Number</u>
1 Reel and Tape Arm Assembly	707-107
1 Component Bin	701-EA
1 Scrap Bin	810-6-6
1 Footswitch	5100-0027
1 Set Standard Horizontal Dies	800A-0040
1 Single Pin Die	800D-7060
1 Transport Wheel System	817-1-200
1 Small Ejector Blade	817-1-12S
1 Tool Kit containing:	850-001-100
3 Hex "T" Wrenches (3/32", 1/8", 1/4")	
1 Hex "T" Wrenches with bend (1/8")	
2 Hex Ball Drivers (9/64", 3/16")	
1 Handi Hex (1/16")	
2 Allen Wrenches (5/32", 7/64")	
1 Transport Wheel Alignment Tool	
1 Large Ejector Blade	
1 Twist Lock Plug	
8 Pin Die Screws	
2 1/4"-20 x 7/8" Hex Cap Screws	
1 Manual	
1 Pad of Set-up Instruction Forms	

## 4.2 Accessory Installation

**Danger** - Keep fingers, clothing, and foreign objects away from wheels and spindles while machine is operating--failure to do so may result in bodily injury or damage to the machine.

### Install reel arm holder & options

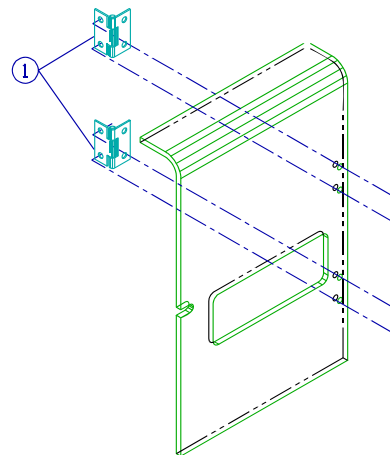
1. Match the rectangular end of the reel arm holder with the indentation on the front of the machine as shown in **Figure 10**, Item 1.
2. Position the reel arm holder so that the arm is slanting upward.
3. Fasten the reel arm holder with two included 1/4-inch cap screws to the position indicated by Item 2.
4. See section 7.0 *Options* for optional equipment attachment instructions.



**Figure 10** CF-8 Front View, Installation

### Install front & rear safety guards

1. Position the front guard so that the hinges on the right side of the guard swing inside as illustrated in **Figure 11**, Item 1.
2. Fasten guard hinges with four included #10 button head screws.
3. Install the rear guard in a similar manner except that the hinges are on the left side of the guard.

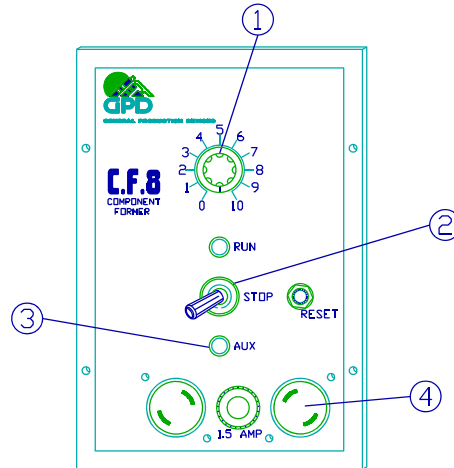


**Figure 11** CF-8 Safety Guard, Installation

### 4.3 Footswitch Installation

The footswitch is an alternative to using the toggle switch (**Figure 12**, Item 2). When installed, depress the footswitch to turn the machine on and release to turn it off.

1. Insert the plug of the footswitch into one of the outlets (Item 4) located on the rear of the CF-8.
2. \*Insert the twist lock plug from the tool kit into the remaining outlet.
3. Turn the plugs clockwise to lock into the outlets.
4. Set the speed control (Item 1) to "0."
5. Set the toggle switch down to "Aux." position. The auxiliary mode indicator light (Item 3) will light.
6. Turn the speed control to the desired operating speed.
7. If necessary to remove the plug, turn the plug counter-clockwise.



**Figure 12** CF-8 Rear View,  
Footswitch Operation

**\*Note:** The auxiliary electrical outlets on the control panel are wired in series. It is necessary to install the twist lock plug to complete the circuit.

## 5.0 Set-Up Procedure

The CF-8 can be set-up to form different component elements. This section details the step-by-step instructions necessary to change the machine set-up. See the end of this section for a summary, in chart form, of the steps to take to set-up the CF-8.

## 5.1 Operations & Functions Summary

This section summarizes the method of operations and station functions the CF-8 uses to cut and form component leads. It is provided as a guide to the forming process and operator interaction with the machine.

### 5.1.1 Method of Operations

The following defines the steps that the CF-8 performs to cut and form axial components. The figure below illustrates the machine's basic operation sequence. If necessary, see section 2.1 *Part Identification* to identify machine related parts.

#### 1. Feed Components

Components are fed into the machine with a bulkfeeder, cardfeeder, on reel and tape, or by hand through the dual infeed chutes (Station 1). See section 7.0 *Options* for bulkfeeder and cardfeeder identification.

#### 2. Cut Leads

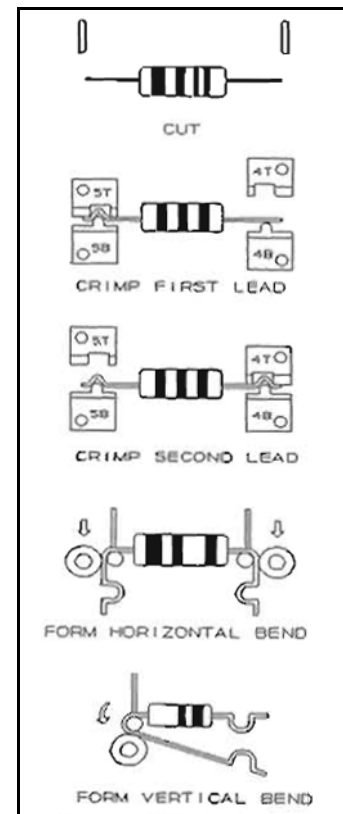
The tooth spaces of the cutting wheels (Stations 2 and 3) carry the components past the cutting blades that cut the leads. Trimmed leads slide down the exit chute into the scrap bin. The sideplate assemblies contain and guide the trimmed component as the cutting wheels carry the component to the transport wheels.

#### 3. Crimp Leads

The transport wheels pick up the component by the body and present it to the die blocks in Stations 4 and 5 where, depending on the type of dies installed, the leads are crimped, cut, or both.

#### 4. Form Legs

Further indexing presents the component to the dies in Stations 6 and 7 where the leads are formed into 90 degree bends or a vertical loop that form the legs of the component.



**Figure 13** CF-8 Operation Sequence

### 5.1.1 Method of Operations (continued)

#### 5. Eject Formed Component

The transport wheels present the fully formed component to the component ejector blade which causes the component to drop into the component bin for retrieval.

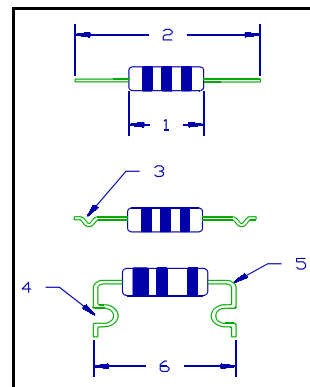
### 5.1.2 Station Function Summary

Stations 1 through 9 are operator adjustable. The following defines each Station's function and action on axial component elements. See 2.1 *Part Identification* for examples of the machine parts referenced in the following.

- **Component elements** are identified in **Figure 14**.

Item 1	Body length
Item 2	Cut length
Item 3	Crimped lead
Item 4	Leg
Item 5	Leg bend
Item 6	Center to center

- **Station 1** adjusts for component body length. This Station adjusts the gaps of the infeed system and the transport wheel pair in tandem. **Always close this station before adjusting the other stations and adjust this station last.**
- **Stations 2 and 3** adjust for initial cut length of the component's lead.
- **Stations 4 and 5** utilize dies which can be chosen to crimp component leads to form components like stand-off, lock-in, and cut-off for either vertical or horizontal forms, and horizontal under-form. In addition, dies can be installed that have secondary cut-offs that trim the lead to a precise cut length.
- **Stations 6 and 7** adjust for the bend of the component's leg and control the center to center of the formed component.
- **Stations 8 and 9** adjust the travel on the roller assembly that controls the amount of bend on the component's leg.



**Figure 14** Component Elements

## 5.2 Initial Set-Up

Follow the instructions in this section **in the order listed** to prepare the CF-8 for die installation. Instructions for the following steps are in this section:

- Power off.
- Adjust Stations for tool change settings.
- Remove component ejector blade & transport wheel pair.

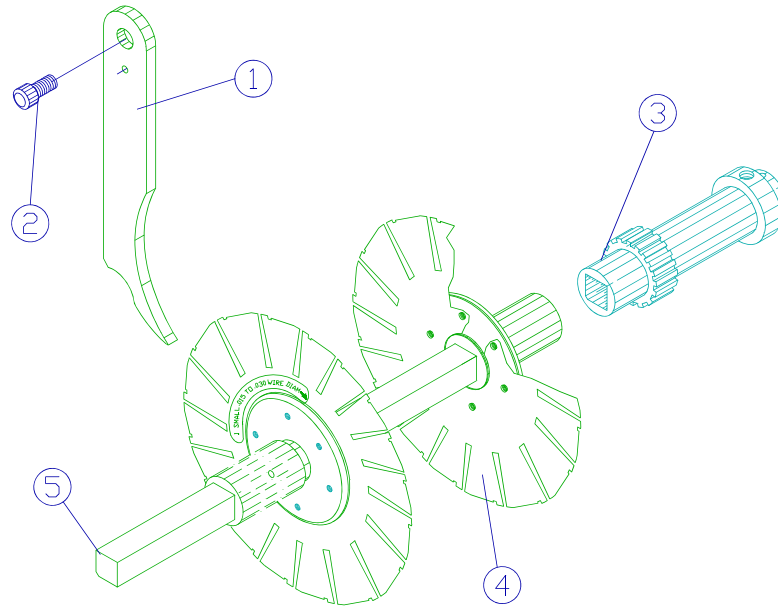
### 1. Power off.

- a) If necessary, see *2.1 Part Identification* to identify the parts of the CF-8 referenced in the following steps.
- b) Locate the speed control, toggle switch, and run mode indicator light on the rear of the machine.
- c) Adjust speed control to "0" and toggle switch to "STOP." The run mode indicator light will go out.

### 2. Adjust Stations for tool change settings.

**Warning** - Damage to the transport wheels can result if the Stations are not adjusted in the order specified below. **Always close Station 1 fully before making any other adjustments and visually inspect the transport wheels to check that they are not in contact with Stations 6 and 7 before operating the machine.**

- a) Adjust Station 1 to fully closed--turn adjustment knob clockwise.
- b) Adjust the counter boxes of Stations 2 through 7 to read 1000. This is the tool change setting.
  - 1) In Stations 2 and 3, use the 9/64-inch hex ball driver (provided in the tool kit) to adjust the readings on the counter box.
  - 2) In Stations 4 through 7, turn the adjustment knobs on the counter boxes.



**Figure 15** CF-8 Left View, Ejector Blade & Transport Wheel Removal

## 5.2 Initial Set-Up (continued)

3. Remove component ejector blade & transport wheel pair.
  - a) Loosen the ejector blade thumbscrew (**Figure 15**, Item 2) and remove the component ejector blade (Item 1) from between the transport wheel pair (Item 4).
  - b) Place a 1/8-inch bent hex "T" wrench (provided in the tool kit) in the hole located toward the end of the transport wheel shaft (Item 5) and pull firmly to unlock the shaft. **Note:** It may be necessary to manually index the machine until the hole toward the end of the transport wheel shaft is accessible. Insert the 1/4-inch hex "T" wrench (provided in the tool kit) in the hex cap screw located on the right of the machine. Turn the wrench until able to insert a wrench in the hole of the transport wheel shaft.
    - 1) Once unlocked, pull shaft smoothly from its receiver carrier (Item 3).
    - 2) Support the transport wheel pair while removing the shaft.
  - c) Place transport wheel pair and shaft aside until ready for replacement.
 

**Caution** - Store the transport wheel pair on a flat surface or on a dowel storage system. To avoid warping or damaging the wheel pair, **do not** store the wheel pair with pressure on its shims.

## 5.3 Select & Install CF-8 Hardware

To process different types of forms:

- Select dies.
- Calculate Station settings.
- Observe Station setting and component dimension limits.
- Install dies.
- Select and install the component ejector blade and transport wheel pair.
- Install or remove the dual infeed chute shims.

Instructions for selecting and installing the proper hardware follows.


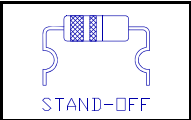

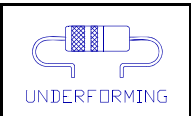
### 5.3.1 Select Dies

Dies are installed in Stations 4, 5, 6 and 7. These Stations:



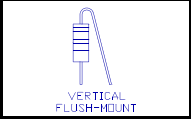
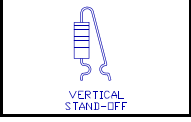
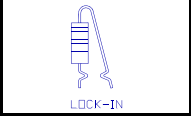

- Crimp the wire leads for the type of forms indicated in the figures below.
- Perform optional secondary cuts on the leads.
- Bend the leads for horizontal or vertical forms.

Stations 4 and 5 dies are cut-off, crimping, or a combination of both. Stations 6 and 7 hold horizontal, modified horizontal, or pin dies.

1. Identify the component form to be processed using the figures below.
2. Select the type of die to use in each Station from the information to the right of the figure.

	<b><u>Station 4</u></b>	<b><u>Station 5</u></b>	<b><u>Station 6</u></b>	<b><u>Station 7</u></b>
	Secondary Cut-Off (Optional)	Secondary Cut-Off (Optional)	Horizontal	Horizontal
	Stand-off	Stand-off	Modified Horizontal	Modified Horizontal
	Lock-in	Lock-in	Modified Horizontal	Modified Horizontal
	Underform	Underform	Modified Horizontal	Modified Horizontal

5.3.1 Select Dies (continued)

	<u>Station 4</u>	<u>Station 5</u>	<u>Station 6</u>	<u>Station 7</u>
	---	---	2A Military Stress Relief SE	2A Military Stress
Relief				
	---	---	2A Military Stress Relief	2A Military Stress
Relief				
	Secondary Cut-Off (Optional)	Secondary Cut-Off (Optional)	---	Pin
	Stand-off	Stand-off	---	Pin
	Lock-in	Lock-in	---	Pin
	---	Vertical Parallel	---	Pin

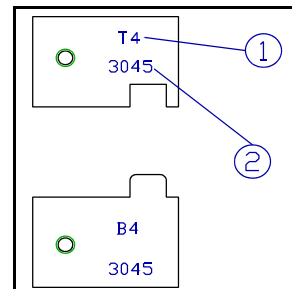
3. Select specific dies to install based on die type and wire diameter of the component to be processed.

- Select dies for **Stations 4 & 5.**

Stations 4 and 5 dies are marked to identify the Station position (**Figure 16**, Item 1) they occupy when installed and the wire capacity (Item 2).

- Select a die type based on the type of component to be formed. See 5.3.1 *Select Dies*, steps 1 and 2.
- Select dies to install based on the wire diameter of the component to be processed.

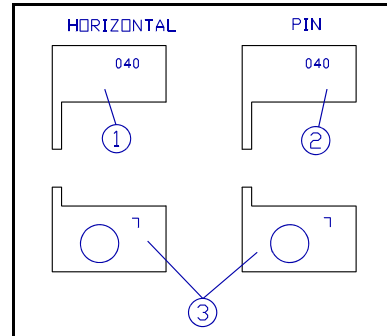
**Example:** "3045" marked on the die pair as in **Figure 16** refers to a wire diameter range of .030 to .045 inches (.76 mm to 1.14 mm).



**Figure 16** Stations 4 & 5 Die Selection

**5.3.1 Select Dies (continued)**

- Select dies for **Stations 6 & 7**.  
Horizontal, modified horizontal, and pin dies are installed in Stations 6 and 7. They are marked to identify the die width (**Figure 17**, Item 1) or pin diameter (Item 2), and the Station position (Item 3) they occupy when installed.
- a) Select a die type based on the type of component to be formed. See 5.3.1 *Select Dies*, steps 1 and 2.
- b) Select a die to install based on the wire diameter of the component to be processed from the charts below.



**Figure 17** Die Identification

**Component Wire Diameter Processing Ranges**

Modified Horizontal & Horizontal Dies				
Die Marked	Inches		Metric (mm)	
	Min.	Max.	Min.	Max.
030	.015	.015	.38	.38
040	.015	.025	.38	.64
060	.015	.045	.38	1.14
080	.015	.060	.38	1.52
100	.015	.060	.38	1.52

**Chart 4** Horizontal Die Processing Ranges

Pin Dies				
Die Marked	Inches		Metric (mm)	
	Min.	Max.	Min.	Max.
040	.000	.020	.00	.51
060	.021	.030	.53	.76
080	.031	.040	.79	1.02
100	.041	.050	1.04	1.27

**Chart 5** Pin Die Processing Ranges

**Note:** The die markings on the horizontal dies equals die width (dwidth).  
The die markings on the pin dies equals pin diameter (pdia).

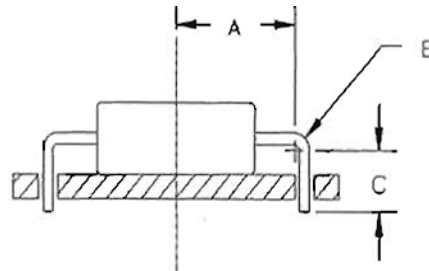
4. Record the die width (dwidth) or pin diameter (pdia) values from Chart 4 or Chart 5 for use in the following 5.3.2 *Calculate Station Settings*.

### 5.3.2 Calculate Station Settings

Calculations are made to set the Station counter boxes to achieve the component's final form. The following calculations are intended for approximate Station settings only. It is expected that the operator will perform the calculations and make minor adjustments to the settings after inspecting (measuring) sample formed components.

1. Identify the desired formed component elements in the figures accompanying the following calculation sections for the type of component to be processed.
2. Perform the calculations in the appropriate section using values for:
  - Component to be processed (such as body length or wire diameter).
  - Desired formed component elements (such as center to center or stand-off height).
  - The die width or pin diameter of the die to be installed.  
(From Chart 4 or Chart 5 in 5.3.1 *Select Dies*, step 3.)
3. Refer to the key listed at the end of each calculation section for abbreviations used in the formulas.

**Example:** The figure at right illustrates a horizontal flush-mount component on a printed circuit board. The values for component elements A, B, and C are defined by equations in each following form calculations section. If you want to form this component, perform the calculations in *Horizontal Flush Mount Form Calculations* to obtain the settings for the Station counter boxes.



**Note:** Station counter box readings are in thousandths of an inch (mm for metric machines). A counter box reading 1000 = 1.0" (254 = 25.4 mm for metric machines).

**Note:** The calculations in this manual for the Station counter box settings are for flush-mount and stand-off forms only. For all other forms, refer to the CF-8 Formula Calculator Package (part no. 8201622) which automatically calculates the Station settings and recommends the appropriate dies for the selected form type. A reference manual is included.

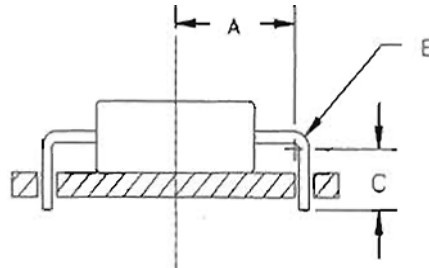
**5.3.2.1 Horizontal Flush-Mount Form Calculations**

1. Use the values below in the following equations/calculations:

- cst = .015" (.38 mm) (constant die dimension)
- trnclr = .025" (.64 mm) (transport wheel clearance)
- edge = .050" (1.27 mm) (cut-off die edge)

2. Calculate the values for the dimensions illustrated in the figure at right:

- A =  $(ctc - (2dwidth + wdia)) \div 2 + cst$
- B =  $((dwidth - cst) + (wdia \div 2)) * (\pi \div 2)$
- C =  $(bdia \div 2) - (B \div (\pi \div 2)) + pcb + prt$



3. Calculate/find the Station settings using the chart below.

Station	Calculation/Setting	Notes
6 & 7	A - cst	<b>To avoid damaging the transport wheels</b> , check that desired center to center (ctc) is <u>greater than</u> : $blen + 2dwidth + wdia + 2trnclr$ {+ .030" (0.76 mm) if using transport wheels with rubber pads}.
2 & 3	A + B + C	If using secondary cut-off dies in Stations 4 & 5, add .150" (3.81 mm) to Stations 2 & 3.
4 & 5	1000 (254 metric)	If using secondary cut-off dies then <b>Stations 4 &amp; 5 = A + B + C - edge</b> .
8 & 9	5 (setting)	For almost all horizontal forms the setting of 5 is recommended. Minor adjustments in the settings may be necessary after inspecting sample formed components.

Chart 6 Horizontal Flush-Mount Form Calculations/Settings

<b>Key:</b> bdia = body diameter	dwidth = die width	prt = protrusion
blen = body length	pcb = board thickness	soh = stand-off height
ctc = center to center	pdia = pin diameter	wdia = wire diameter

**5.3.2.2 Horizontal Stand-Off Form Calculations**

1. Use the values below in the following equations/calculations:

cst = .015" (.38 mm) (constant die dimension)  
 dimple = .020" (.51 mm) (wire dimple allowance)

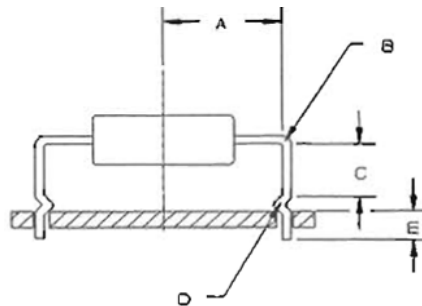
2. Find the die variable values in the chart below for use in the following equations/calculations:

	1530 Dies		3045 Dies		4560 Dies	
Variable	Inches	Metric (mm)	Inches	Metric (mm)	Inches	Metric (mm)
x	.149	3.78	.199	5.05	.237	6.02
y	.021	0.53	.041	1.04	.076	1.93

Chart 7 Horizontal Stand-Off Die Dimension Variable Values

3. Calculate the values for the dimensions illustrated in the figure at right:

A = (ctc - (2dwidth + wdia) ÷ 2 + cst  
 B = ((dwidth - cst) + (wdia ÷ 2)) \* (π ÷ 2)  
 C = (bdia ÷ 2) - (B ÷ (π ÷ 2)) + soh - x  
 D = x + dimple  
 E = pcb + prt



4. Calculate/find the Station settings using the chart below.

Station	Calculation/Setting	Notes
6 & 7	A - cst	To avoid damaging the transport wheels, check that desired center to center (ctc) is less than: $blen + 2dwidth + wdia + 2trnclr$ {+.030" (0.76 mm) if using transport wheels with rubber pads}.
2 & 3	A + B + C + D + E	If using stand-off dies with secondary cut-offs in Stations 4 & 5, add .150" (3.81 mm) to Stations 2 & 3.
4 & 5	A + B + C - y	
8 & 9	5 (setting)	For almost all horizontal forms the setting of 5 is recommended. Minor adjustments in the settings may be necessary after inspecting sample formed components.

Chart 8 Horizontal Stand-Off Form Calculations/Settings

**Key:** bdia = body diameter      dwidth = die width      prt = protrusion  
 blen = body length      pcb = board thickness      soh = stand-off height  
 ctc = center to center      pdia = pin diameter      wdia = wire diameter

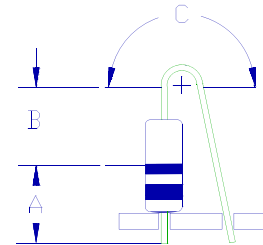
**5.3.2.3 Vertical Flush-Mount Form Calculations**

1. Use the values below in the following equations/calculations:

edge = .050" (1.27 mm) (cut-off die edge)  
 trnclr = .025" (.64 mm) (transport wheel clearance)

2. Calculate the values for the dimensions illustrated in the figure at right:

A =  $blen \div 2 + pcb + prt$   
 B =  $blen \div 2 + (pdia \div 2) + trnclr$   
 C =  $\pi * ((pdia \div 2) + (wdia \div 2))$



3. Calculate/find the Station settings using the chart below.

Station	Calculation/Setting	Notes
6	1000 (254 metric)	For this type of form, this Station performs no bending and no die is installed. This setting backs the Station away from the forming process.
7	$B - (pdia \div 2)$	This formula is for the <u>minimum</u> distance from the end of the body to the beginning of the bend in the lead. For longer distances add desired value to dimension B.
2	A	
3	$A + 2B + C$	If using secondary cut-off dies in Stations 4 & 5, add .150" (3.81 mm) to Stations 2 & 3. The minimum cut length of Station 2 is $blen \div 2 + .160"$ (metric = $blen \div 2 + 4.06$ mm). As a result, .100" (2.54 mm) is about the smallest possible protrusion below the board. For shorter protrusions, use secondary cut-off dies in Stations 4 & 5.
4 & 5	1000 (254 metric)	If using secondary cut-off dies, then <b>Station 4 = A - edge</b> and <b>Station 5 = A + 2B - edge</b> .
8	5 (setting)	Station 8 requires no adjustment since Station 6 performs no bend.
9	12 (setting)	For almost all vertical forms the setting of 12 is recommended. Minor adjustments in the settings may be necessary after inspecting sample formed components.

**Chart 9** Vertical Flush-Mount Form Calculations/Setting

<b>Key:</b> bdia = body diameter	dwidth = die width	prt = protrusion
blen = body length	pcb = board thickness	soh = stand-off height
ctc = center to center	pdia = pin diameter	wdia = wire diameter

### 5.3.2.4 Vertical Stand-Off Form Calculations

- Use the values below in the following equations/calculations:

dimple = .020" (.51 mm) (wire dimple allowance)

trnclr = .025" (.64 mm) (transport wheel clearance)

- Find the die variable values in the chart below for use in the following equations/calculations:

Variable	1530 Dies		3045 Dies		4560 Dies	
	Inches	Metric (mm)	Inches	Metric (mm)	Inches	Metric (mm)
x	.149	3.78	.199	5.05	.237	6.02
y	.021	0.53	.041	1.04	.076	1.93

Chart 10 Vertical Stand-Off Die Dimension Variable Values

- Calculate the values for the dimensions illustrated in the figure at right:

$$A = \text{blen} \div 2 + \text{soh} - x$$

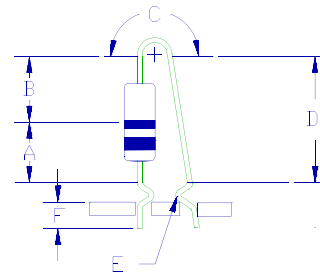
$$B = \text{blen} \div 2 + (\text{pdia} \div 2) + \text{trnclr}$$

$$C = \pi * ((\text{pdia} \div 2) + (\text{wdia} \div 2))$$

$$D = A + B$$

$$E = x + \text{dimple}$$

$$F = \text{pcb} + \text{prt}$$



(Continued on next page)

---

<b>Key:</b> bdia = body diameter	dwidth = die width	prt = protrusion
blen = body length	pcb = board thickness	soh = stand-off height
ctc = center to center	pdia = pin diameter	wdia = wire diameter

---

### 5.3.2.4 Vertical Stand-Off Form Calculations (continued)

4. Calculate/find the Station settings using the chart below.

Station	Calculation/Setting	Notes
6	1000 (254 metric)	For this type of form, this Station performs no bending and no die is installed. This setting backs the Station away from the forming process.
7	$B - (pdia \div 2)$	This formula is for the <u>minimum</u> distance from the end of the body to the beginning of the bend in the lead. For longer distances add desired value to dimension B.
2	$A + E + F$	
3	$A + E + F + 2B + C$	If using secondary cut-off dies in Stations 4 & 5, add .150" (3.81 mm) to Stations 2 & 3.
4	$A - y$	
5	$A + 2B + C - y$	If only crimping lead in Station 4, then Station 5 = 1000 (254 metric). Conversely, if only crimping lead in Station 5, then Station 4 = 1000 (254 metric). If using a secondary cut-off die, then $y = .050$ " (1.27 mm) in the Station that is not crimping the lead.
8	5 (setting)	Station 8 requires no adjustment since Station 6 performs no bend.
9	12 (setting)	For almost all vertical forms the setting of 12 is recommended. Minor adjustments in the settings may be necessary after inspecting sample formed components.

Chart 11 Vertical Stand-Off Form Calculations/Setting

---

<b>Key:</b> bdia = body diameter	dwidth = die width	prt = protrusion
blen = body length	pcb = board thickness	soh = stand-off height
ctc = center to center	pdia = pin diameter	wdia = wire diameter

---

### 5.3.3 Observe Processing Limits

After calculating the Station settings, use this section to make sure that you are in compliance with the station setting and component dimension limits.

1. Observe the machine's limits as listed in the chart below:

Machine Processing Limits					
		Inches		Metric (mm)	
		Minimum	Maximum	Minimum	Maximum
Station 2	(blen÷2) +	.160	1.900	4.06	48.26
Station 3	(blen÷2) +	.160	1.800	4.06	45.72
*Station 4	(blen÷2) +	.025	1.400	.64	35.56
*Station 5	(blen÷2) +	.025	1.340	.64	34.04
**Station 6	(blen÷2) +	.025	1.300	.64	33.02
**Station 7	(blen÷2) +	.025	1.220	.64	30.99
Ejector Blade (small blade) (Component Body Length)		.000	.325	.00	8.26
Transport Wheel # 1 (Component Wire Diameter)		.015	.029	.38	.74
Transport Wheel # 2 (Component Wire Diameter)		.029	.042	.74	1.07
Transport Wheel # 3 (Component Wire Diameter)		.042	.062	1.07	1.57

Chart 12 CF-8 Processing Limits

- \* For the **Horizontal Center to Center** form:  
Add .060" (1.52 mm) to Stations 4 and 5 minimums.
- \*\* For the **Military Stress Relief** form:  
Add the appropriate forming plate thickness of .060" or .075" (1.52 or 1.91 mm) to Stations 6 and/or 7 minimums.

---

**Key:** bdia = body diameter      dwidth = die width      prt = protrusion  
 blen = body length      pcb = board thickness      soh = stand-off height  
 ctc = center to center      pdia = pin diameter      wdia = wire diameter

---

### 5.3.3 Observe Processing Limits (continued)

2. Observe the component's dimension limits as listed in the chart below:

Component Dimension Processing Limits				
	Inches		Metric (mm)	
	Minimum	Maximum	Minimum	Maximum
Body Diameter	.050	.750	1.27	19.05
Body Length	.135	2.000	3.43	50.80
Center to Center	**	2.400	**	60.96
Wire Diameter	.015	.060	.38	1.52

**Chart 13** CF-8 Component Dimension Processing Limits

\*\* Minimum center to center is dependent on the type of die used and the type of component being processed.

**Note:** If wire diameter is greater than .029" (0.74 mm) install infeed shims. Refer to 5.3.6 *Install or Remove Dual Infeed Chute Shims*.

### 5.3.4 Install Dies

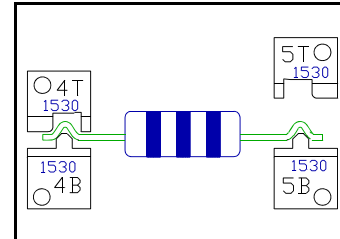
Follow the instructions in this section to install dies in Stations 4, 5, 6, and 7.

#### 1. Install dies in Stations 4 & 5.

Dies installed in Stations 4 and 5 are paired and stamped with markings on the dies to indicate the position they occupy when installed. Install the die half marked:

- "T" in the **t**op die holder.
- "B" in the **b**ottom die holder.

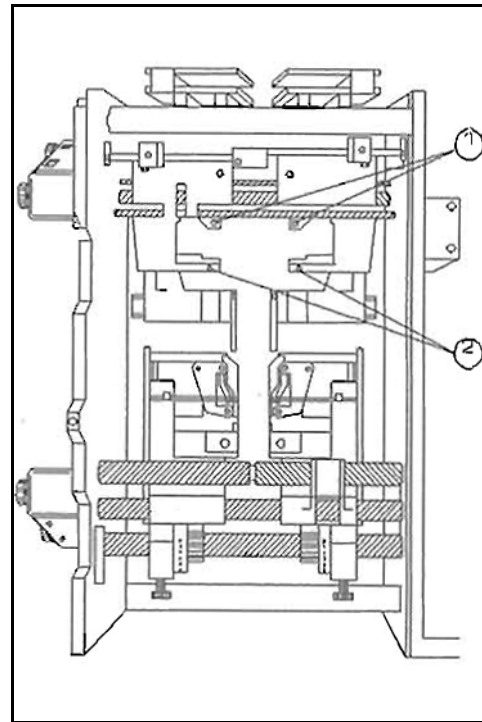
The numbers "4" or "5" indicate which Station the die is to occupy. **Figure 18** illustrates the die markings and an example of the crimping performed.



**Figure 18** Stations 4 & 5 Die Markings

#### a) To install dimpling dies:

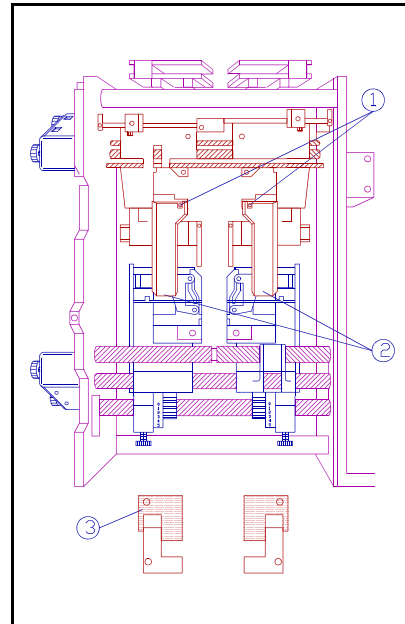
- 1) Open Stations 4 and 5 enough to allow easy access to the die holders.
- 2) Clean die holders of all debris.
- 3) Place dies in lower holders (**Figure 18**, Item 2) with die markings facing the rear of the machine.
- 4) Push dies into the corners of the holders and fasten with 8/32x3/8 socket head screws provided.
- 5) Follow above procedure to install upper dies.
- 6) **Manually** index the machine to visually inspect the alignment of the upper and lower dies.
- 7) If necessary, loosen the die screws, manually align dies flush with each other, and retighten die screws.



**Figure 19** Dimpling Die Installation, Front View

### 5.3.4 Install Dies (continued)

- b) **To install secondary cutting dies:**
- 1) Clean die holders of all debris.
  - 2) Follow the dimpling die installation procedure outlined above to install the upper and lower dies.
  - 3) Manually index the machine and visually inspect that the upper dies align with the lower dies as indicated in **Figure 20**, Item 3.
  - 4) If necessary, loosen the die screws, manually align dies, and retighten die screws.
  - 5) Check that the cut component leads do not brush the secondary exit chutes (Item 2).
    - If so, loosen the lower die holder screws (Item 1) and move the exit chutes away from the leads and retighten the die holder screws.

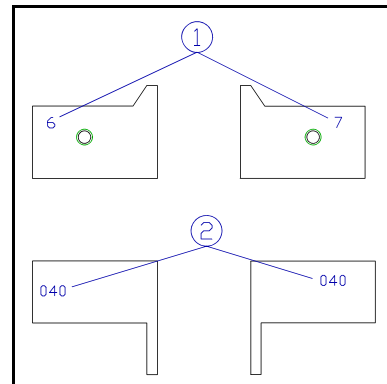


**Figure 20** Secondary Cut-Off Die Installation, Front View

### 2. Install dies in Stations 6 & 7.

Dies installed in Stations 6 and 7 are stamped on the:

- Rear to indicate the Station they occupy when installed (**Figure 21**, Item 1).
- Top to indicate the width of the forming surface (Item 2).



**Figure 21** Stations 6 & 7 Die Markings

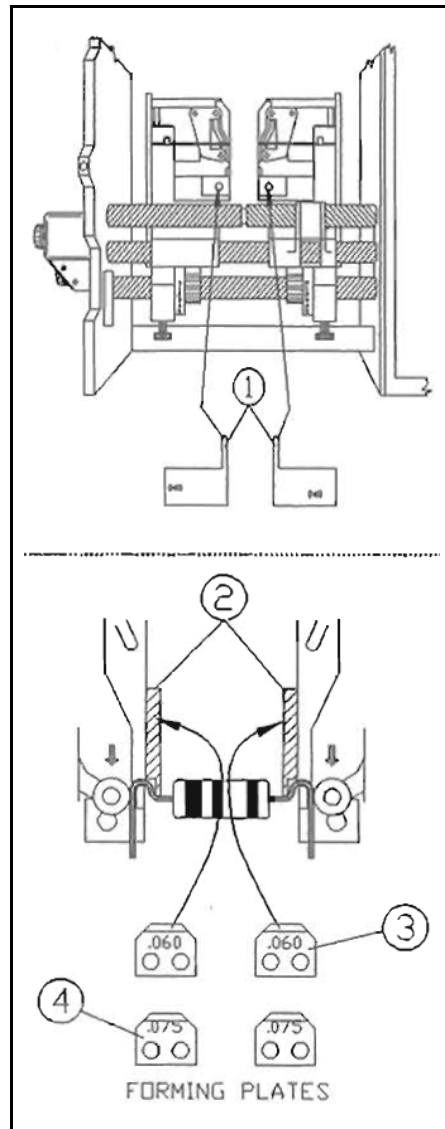
### 5.3.4 Install Dies (continued)

a) **To install horizontal and pin dies:**

- 1) Open Stations 6 and 7 wide enough to allow easy access to the die holders.
- 2) Clean die holders of all debris
- 3) Place dies in holders with the Station numbers facing the rear of the machine (**Figure 22**, Item 1)
- 4) Push dies into the corners of the holders and fasten with the 8/32x3/8 screws provided.

b) **To install double hump military stress relief dies:**

- 1) Open Stations 6 and 7 wide enough to allow access to the die holders.
- 2) Mount the appropriate forming plate (using the 800L-002 wrench and the 2-56 flat head screws provided) on the inside of the wire clamps as indicated **Figure 22**, Item 2.
  - Install plate marked 060 (Item 3) for wire diameter .015 to .030 inches (.38 to .76 mm).
  - Install plate marked 075 (Item 4) for wire diameter over .030 inches (.76 mm).
- 3) Install the stress relief dies in Stations 6 and 7 following the procedure outlined above for horizontal and pin dies.



**Figure 22** Stations 6 & 7 Die Installation, Front View

c) **To install single hump military stress relief dies:**

- 1) Follow double hump military stress relief die installation procedure above to install forming plate in Station 7 only.
- 2) Follow military stress relief die installation procedure above to install the dies except place the die marked SE in Station 6.

### 5.3.5 Select & Install Transport Wheel Pair & Component Ejector Blade

Instructions for the following steps are included in this section:

- Select component ejector blade and transport wheel pair.
  - Check transport wheel pair timing.
  - Install transport wheel pair.
  - Install component ejector blade.
1. Select component ejector blade & transport wheel pair.
    - a) The CF-8 comes with two different sized component ejector blades. To process components with body lengths over .325" use the larger ejector blade.
    - b) Each of three available transport wheel pair unit is labeled to identify the range of wire diameter it will handle and the direction of rotation of the wheels.
      - Select a transport wheel pair to install based on the wire diameter of the component to be processed from the chart below.

Transport Wheel Pair Component Wire Diameter Processing Ranges				
Transport Wheel #	Inches		Metric (mm)	
	Minimum	Maximum	Minimum	Maximum
1	.015	.030	.38	.76
2	.030	.042	.76	1.07
3	.042	.062	1.07	1.58

Chart 14 Transport Wheel Selection

2. Check transport wheel pair timing.
  - a) Place the right transport wheel and the alignment tool (**Figure 23**, Item 1) on the square shaft (Item 3).
  - b) Time the wheel by locating the pin of the alignment tool in the wire pick-up position. See **Figure 23**, Item 2, for example.
  - c) Repeat the timing procedure above for the left transport wheel.

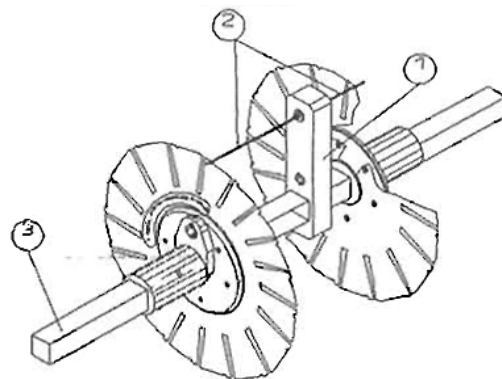
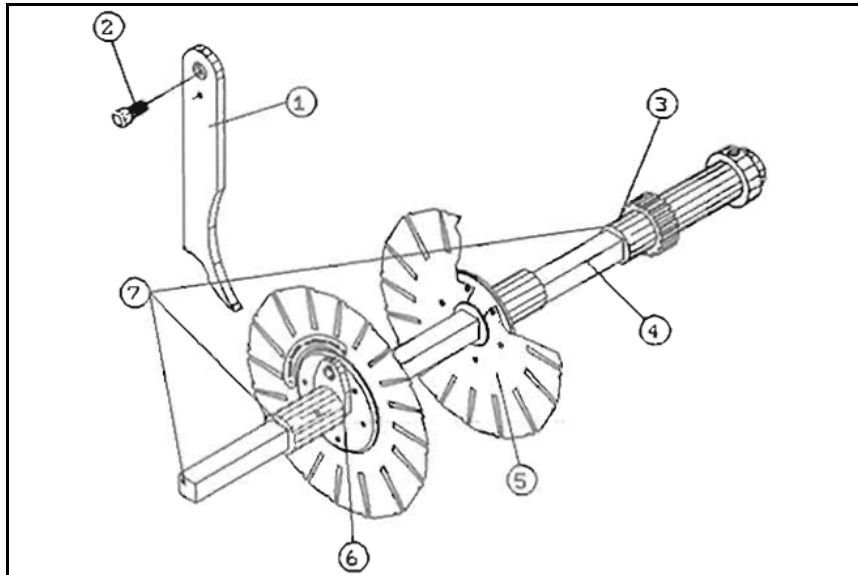


Figure 23 Transport Wheel Timing



**Figure 24** Transport Wheel Installation, Left View

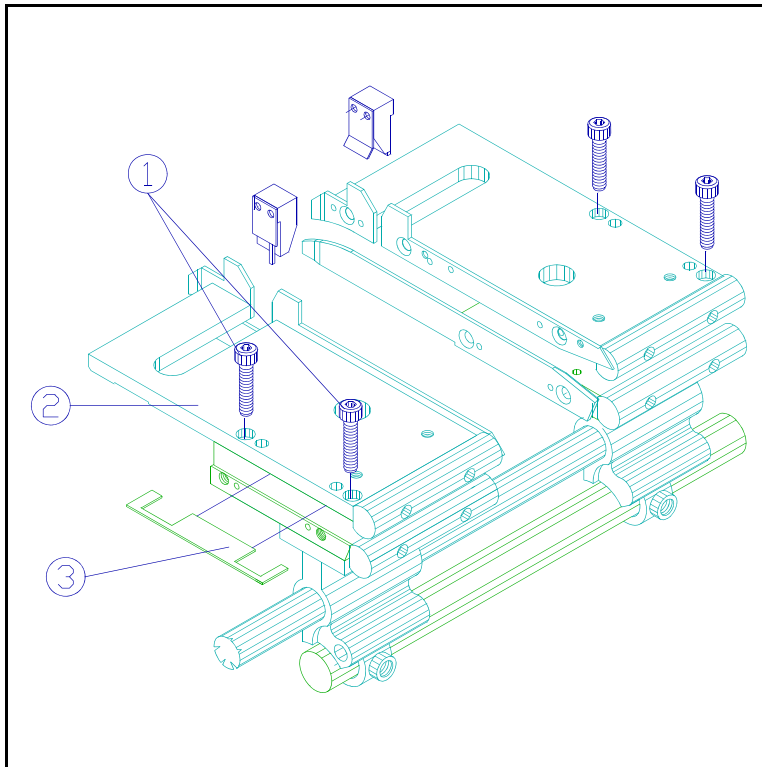
### 5.3.5

#### Select & Install Transport Wheel Pair & Component Ejector Blade (continued)

3. Install transport wheel pair.
  - a) Place the transport wheel pair hubs (**Figure 24**, Item 6) on the square shaft (Item 4) while aligning the red mark on the square shaft with the red marks on the transport wheel hubs. See **Figure 24**, Item 7, for example.
  - b) Raise the aligned shaft above the transport wheel hub guides (see 2.1.3 *Left View* to identify).
  - c) Roll the aligned shaft down along the side of the guide and then up into the forks of the guides.
  - d) Align the red mark of the shaft with the red mark of the receiver carrier (Item 3) and press shaft firmly into the carrier until the shaft locks into position.
  
4. Install selected component ejector blade.
  - a) Place the selected component ejector blade (Item 1) onto its shaft.
  - b) Position ejector blade between the transport wheel pair.
  - c) Fasten ejector blade to shaft with its thumbscrew (Item 2).

### 5.3.6 Install or Remove Dual Infeed Chute Shims

If the wire diameter of the component to be processed is greater than .029 inches (0.74 mm) it is necessary to install shims in the dual infeed chutes. The shims are placed below the top plates of the chutes. See procedure outlined below.



**Figure 25** Infeed Chute, Top View, Shim Installation

1. Loosen the hex screws (Figure 25, Item 1) from the top of the infeed chute.
2. Place the infeed shim so that it is positioned under the top plate (Item 2) of the infeed chute as indicated in Figure 25, Item 3.
3. Refasten the hex screws.
4. If wire diameter is less than .030 inches (0.76 mm), remove infeed shims by following the reverse of the procedure above.

## 5.4 Adjust Stations

This section contains instructions for setting the Stations prior to production run. **Follow the instructions** in 5.2 *Initial Set-Up* and 5.3 *Select & Install CF-8 Hardware* **before** adjusting the Stations.

- Use the Station setting calculations obtained from section 5.3.2 *Calculate Station Settings* to set the counter boxes of Stations 2 through 7.
- See section 2.1 *Part Identification* if necessary to identify parts of the CF-8 referenced in the following instructions.

### 5.4.1 Adjust Stations 2 & 3

- Use the 9/64" hex ball driver from the tool kit to adjust the counter boxes for desired cut length of component's leads.

### 5.4.2 Adjust Stations 4 & 5

- Turn the adjustment knobs on the counter boxes to adjust for crimp position (and secondary cut-off, if any) on the component leads.  
**Note:** Since Station 5 crimps before Station 4, the component may not be completely re-centered on the transport wheels before being crimped by Station 4. As a result, it may be necessary to set Station 4 up to .020 inches (0.51 mm) less than Station 5.

### 5.4.3 Adjust Stations 6 & 7

- Turn the adjustment knobs on the counter boxes to adjust for placement of the bend on the component legs.

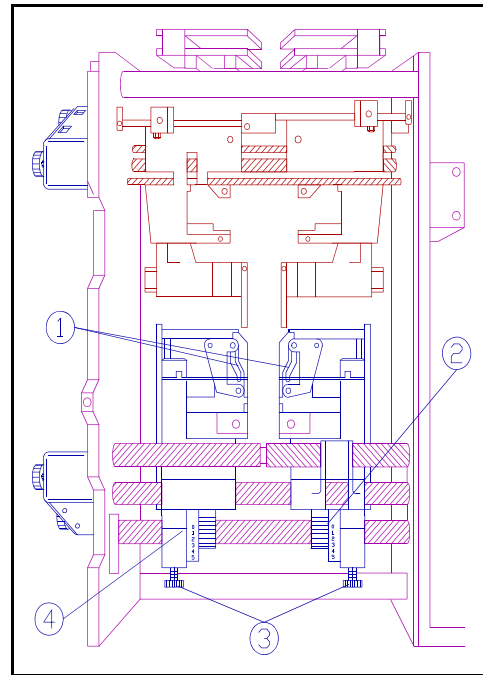
### 5.4.4 Adjust Stations 8 & 9

Stations 8 and 9 can be set from 0 to 12 and control the amount of bend on the component's leg by Stations 6 and 7. Horizontal 90 degree bends are formed when these Stations are normally set at 5. Vertical forms require more bend to form the loop on one leg. The higher the setting above 5 on Stations 8 and 9, the more the leg is bent over 90 degrees. **Do not** set Stations 8 or 9 past 7 unless a pin die is installed in Stations 6 or 7.

- Set the eccentric shaft collar to form horizontal or vertical bends on the component legs. See procedure below.

#### 5.4.4 Adjust Stations 8 & 9 (continued)

1. To form horizontal components, set Stations 8 and 9 at 5.
  - a) Loosen the eccentric shaft thumbscrews (**Figure 26**, Item 3).
  - b) Rotate the eccentric shaft collar (Item 2) until the stamped notch above the Station number points to setting 5.
  - c) Re-tighten thumbscrews to lock in the adjustment.
  - d) Manually index the CF-8 and check that the wire clamps meet the lead wire at the same time on both sides.
    - If not, loosen the thumbscrews and make fine adjustments to the settings of the eccentric shaft collar until the wire clamps meet the lead wire at the same time.



**Figure 26** Stations 8 & 9 Settings

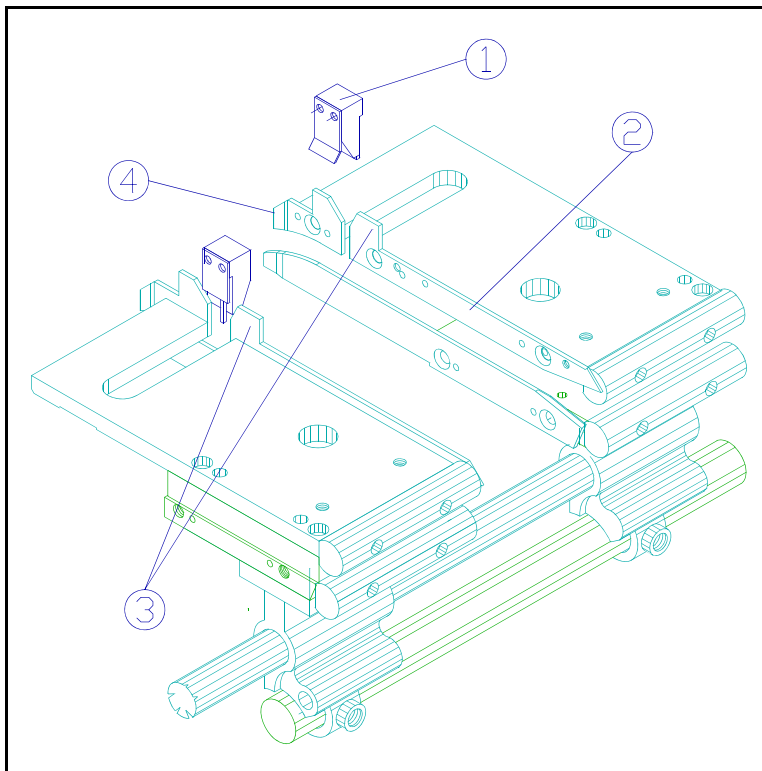
2. To form vertical components, set Station 9 initially at 10.
  - Form sample components (see *5.5 Form Sample Components*).
  - Increase the setting if too little loop.
  - Decrease the setting if too much loop.

**Note:** It is an option to form vertical bends in Station 6 instead of Station 7. If so, install a pin die in Station 6 and follow procedure above to adjust the Station 8 setting.

**Caution:** To avoid undue wear and stress on the machine, always return Stations 8 and 9 to a setting of 5 when forming horizontal bends. **Do not** exceed a setting of 7 when forming horizontal components. If it is necessary to exceed a setting of 7 at Stations 8 and 9 to form 90 degree bends, see section *9.0 Troubleshooting* to diagnose the problem.

### 5.4.5 Adjust Station 1

1. Refer to 5.3.6. *Install or Remove Dual Infeed Chute Shims.*
  - a) If the wire diameter of the component is **greater** than .029 inches (.074 mm) install shims.
  - b) If the wire diameter of the component is **less** than .030 inches (.076 mm) remove shims.
2. Turn Station 1 adjustment knob to adjust for component body length and centering through the cutting wheel pair.
  - See procedure below.



**Figure 27** Top View, Station 1 Adjustment, Infeed Chute

- a) Turn Station 1 adjustment knob *counter-clockwise* to increase the gap between the infeed chute guide blades (**Figure 27**, Item 2) far enough to accept the component to be processed.
  - b) Remove the infeed chute plugs (Item 1) by pulling straight up.
  - c) Place a single component between the infeed component guides (Item 3) and allow it to drop to engage the teeth of the cutting wheel pair.
  - d) Run the machine at slow speed until the component exits the infeed chute stepped guides (Item 4).

### 5.4.5 Adjust Station 1 (continued)

- e) Check that the component body does not foul in the stepped guides or for excessive play between the stepped guides.
  - 1) If the component body fouls between the stepped guides, turn the adjustment knob *counter-clockwise* until the component travels freely between the guides.
  - 2) If there is excessive play between the stepped guides, turn the adjustment knob *clockwise* to decrease the gap between stepped guides.

**Warning:** **Do not** force the adjustment of Station 1. Damage to the infeed chutes, cutting wheels, or components may result. **Always adjust Station 1 to a closed position before adjusting all other Stations.**

## 5.5 Form Sample Components

To verify Station settings, form sample components prior to production run.

1. If open, close and secure the safety guards so they will engage the safety switches (see 2.1.3 *LEFT VIEW* if necessary for identification).
2. Introduce a component into the infeed chute.
3. Adjust the speed control to a low setting and the toggle switch to "RUN" and allow the component to progress through all Stations.
4. Inspect and measure the formed component for desired specifications.
5. Readjust Station settings if necessary and run another sample component.  
**Readjustment Example:** If the cut length of the left lead is .020 inches (0.51 mm) shorter than desired, increase the reading on the counter box of Station 3 by 20 (5 metric).
6. If components are not being cut and formed correctly after checking all adjustments and readjusting, see section 9.0 *Troubleshooting* to identify the problem.

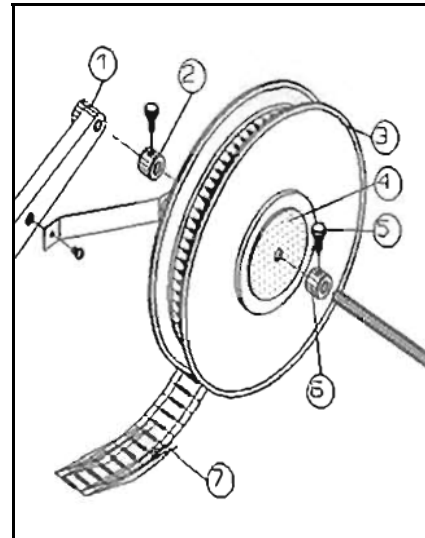
**Note:** All component bodies can vary in length by 5% or more. Also, some components have uneven protrusions on the ends of the component bodies. The CF-8 cannot compensate for these factors. Variations in the measurements of the cut and formed components may occur. As a result, all Station settings are approximations only.

## 5.6 Install Taped Components

Taped components can be fed into the CF-8 for a large production run. Follow the procedure below to install, adjust, and process taped components.

### Install

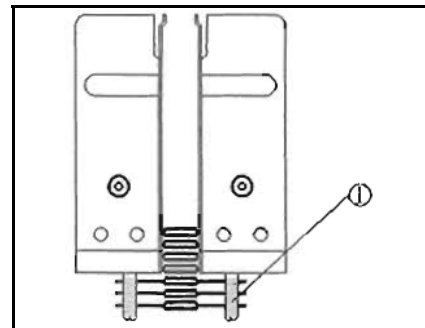
1. Loosen the thumbscrews (**Figure 28**, Item 5) of the inner and outer locking collars (Items 2 & 6) and remove the outer aluminum washer (Item 4) from the reel and tape arm (Item 1).
2. Place the taped components reel (Item 3) onto the reel and tape arm.
  - Orient the reel so that when viewed from the left side of the machine, the taped components travel down from the right side of the reel, not the left.
  - See **Figure 28**, Item 7, for example.



**Figure 28** CF-8 Taped Components Installation

### Adjust

1. Center the components in the infeed chute as illustrated in **Figure 28**, Item 1.
2. Align the reel of taped components with the centered components in the infeed chute.
3. Position both aluminum washers against the centered reel of components.
4. Place locking collars against the washers and tighten the thumbscrews of the locking collars to hold the centered reel in place.



**Figure 29** Infeed Chute, Top View, Component Centering

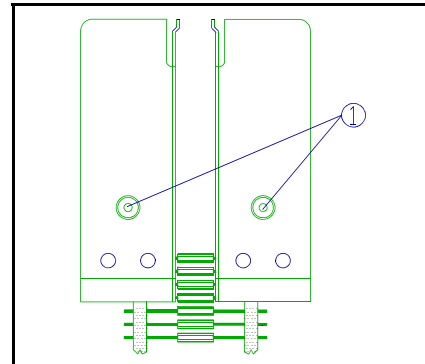
### Process

1. Slide components through infeed chute so that the wire leads engage evenly with the teeth of the cutting wheel pair.
2. Run the machine at low speed and check that the components are being cut and formed to desired specifications.
3. If the components are not being cut and formed to specification, re-check relevant adjustments.
4. After adjustments are set, run the machine at chosen processing speed to process components.

## 5.7 Install Optional Feeders

If the CF-8 came with optional feeding attachments, remove the taped component dual infeed chute from its mount.

1. Remove the two hex-head cap screws located on the top of the infeed chute, as indicated in **Figure 30**, Item 1.
2. Lift the chute up off the machine.
3. Store the infeed chute in secure area for protection.
4. Refer to *7.1 Bulkfeeder & Cardfeeder Set-Up* to select and install optional feeders.



**Figure 30** Infeed Chute, Top View, Removal

**Note:** When re-installing the taped component dual infeed chute, be sure to align the pins of the chute mount with the holes on the bottom of the chute.

## 5.8 Set-Up Adjustments Summary

As a quick reference for setting up the CF-8, the following steps are listed in chart form **in order** of set-up. **See relevant section noted beside each step for instructions on how to perform each step.**

Steps	Reference Section
Power the machine down and make initial tool change adjustments.	<i>5.2 Initial Set-Up, steps 1 &amp; 2.</i>
Remove the component ejector blade and transport wheels.	<i>5.2 Initial Set-Up, step 3.</i>
Identify the component form to be processed.	<i>5.3.1 Select Dies, step 1.</i>
Select dies based on component form, die type, and wire diameter.	<i>5.3.1 Select Dies, steps 2 &amp; 3.</i>
Calculate the Station settings.	<i>5.3.2 Calculate Station Settings.</i>
Check that Station settings and component dimensions are within processing limits.	<i>5.3.3 Observe Processing Limits.</i>
Install the selected dies.	<i>5.3.4 Install Dies</i>
Select and install the transport wheels and component ejector blade.	<i>5.5 Select &amp; Install Transport Wheel Pair &amp; Component Ejector Blade.</i>
Install or remove dual infeed chute shims.	<i>5.3.6 Install or Remove Dual Infeed Chute Shims.</i>
Adjust the Stations to cut and form components.	<i>5.4 Adjust Stations.</i>
Form sample components prior to production run.	<i>5.5 Form Sample Components.</i>
Install, adjust, and process taped components.	<i>5.6 Install Taped Components.</i>
Or install optional feeders.	<i>5.7 Install Optional Feeders.</i>

Chart 15 Set-Up Steps Quick Reference

## 6.0 Operating Instructions

The following instructions apply to a CF-8 equipped with the standard reel and tape arm and dual infeed chute. For instructions on optional feeders, see section 7.1 *Bulkfeeder & Cardfeeder Set-Up*.

### 6.1 Power On

1. Read section 3.0 *Safety Instructions* for safe machine operation.
2. If necessary, see section 2.1 *Part Identification* for location of CF-8 parts.
3. Turn toggle switch to the "Stop" position.
4. Plug the CF-8 into the appropriate power supply.
5. Verify set-up adjustments for the components to be processed.
  - a) Check the Station settings for the component to be processed.
  - b) Load the reel and tape arm with components to be processed.
    - 1) Check that components are centered and slide forward freely in infeed chute.
    - 2) Check that the reel and tape arm is properly aligned with the centered components.
6. Check that the component and scrap bins are empty and in place.
7. Check that the safety guards are in their proper positions.

**Note:** See section 5.0 *Set-Up Procedure* if necessary for details on the proper steps to take to check the adjustments above.

### 6.2 Operating Instructions

1. Slide a short strip of taped components through infeed chute to engage with teeth of the cutting wheel pair.
2. Turn the speed control to "0," turn the machine on, and increase speed.
3. Allow components to proceed through all Stations and then inspect the cut and formed components for desired specifications.
4. If necessary, re-check set up adjustments for the components to be processed.
5. Turn speed control to desired operating speed.
6. Re-load reel and tape arm with reel of taped components to be processed when necessary.
  - a) Turn speed control to "0" **before** introducing components into infeed chute.
  - b) **After** the CF-8 is processing properly, turn machine to desired operating speed.
7. Empty component bin when full or if changing type of component to be processed.

### 6.3 Power Off

1. Turn speed control down to "0."
2. Set toggle switch to "Stop" position.

## 7.0 Options

The following options are available for the GPD CF-8:

- Bulkfeeders
- Calculator Software Package
- Cardfeeders
- Digital Electronic Component Counter
- Lazy Susan
- Markings Up
- Recommended Spare Parts Kit
- Secondary Exit Chute
- Work Station

Instruction manuals for the calculator software package and digital electronic component counter options are included when ordered. Instructions for options requiring installation and/or adjustment that do not have their own instruction manual follow.

**Note:** The markings up option allows the operator to interrupt the lead forming process before the legs of the component are formed. This allows the operator to manually turn the components so that any markings will be on the top of the component after the horizontal bend on the leads are formed.

### 7.1 **Bulkfeeder & Cardfeeder Set-Up**

The bulkfeeder and cardfeeder options allow the CF-8 to process components other than single-fed or tape-mounted. Loose components can be introduced to the bulkfeeder by hand or by an optional hopper and arm assembly.

Both models of feeders have identical bases, and are adjusted and mounted in the same manner. Use the following instructions to install and adjust both options.

Upon receiving the feeder, examine it for any shipping damage that may have occurred. Look for bent or broken parts and check that the gears turn freely. If damage is evident, contact GPD. The address and phone number are on the cover page of this manual.

#### 7.1.1 **Feeder Identification & Processing Ranges**

The cardfeeder option is available in a standard height. The bulkfeeder option comes in a tall or a short version. The tall version can accommodate an optional hopper and arm assembly. See section 7.2 *Hopper & Arm Assembly Installation* for instructions to install and adjust this option.

**7.1.1 Feeder Identification & Processing Ranges (continued)**

Both feeder options are identified by:

- Part numbers that indicate the recommended range of wire diameter of the components to be processed.
- Whether a hopper and arm assembly are included.

To aid in identifying your feeder, the version and range is stamped on the base of both feeder options. **For example**, "1B 020 032" indicates a tall bulkfeeder capable of processing components with a wire diameter of .020" to .032" (.51 mm to .81 mm). A letter stamped on the base without an accompanying number indicates a cardfeeder of standard height.

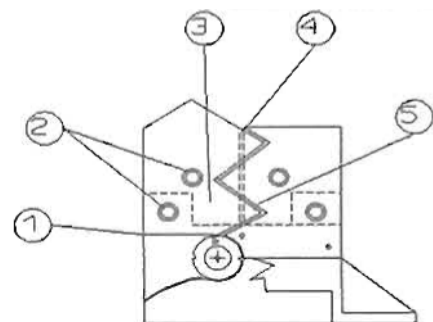
The chart below shows the wire processing ranges, version, and part number of available feeders.

Feeder Processing Ranges & Identification			
Version	.030" - .055" (.76 - 1.40 mm)	.020" - .032" (.51 - .81 mm)	.014" - .020" (.36 - .51 mm)
Tall (with hopper)	BCF-1A	BCF-1B	BCF-1C
Tall (no hopper)	BCF-1ANH	BCF-1BNH	BCF-1CNH
Short	BCF-2A	BCF-2B	BCF-2C
Cardfeeders	CCF-TYPE-A	CCF-TYPE-B	CCF-TYPE-C
<p><b>Note:</b> BCF = Bulkfeeder; CCF = Cardfeeder  <b>Note:</b> Do not attempt to process components with wire diameters that fall outside the range specified above for your feeder. Wire diameters that are too large will not travel properly through the chutes of the feeders. Wire diameters that are too small will not be cut and formed consistently to desired specifications.</p>			

Chart 16 Optional Feeder Identification

**Figure 31** illustrates the gap in the upright stampings of the bulk- and cardfeeders (Item 5 is an example of the zig-zag chute of the Bulkfeeder; the broken lines of Item 4 show the straight chute of the Cardfeeder). The width of the gaps of the chutes are factory pre-set to run the wire diameter ranges that the feeders can handle.

**Note:** Do not loosen the button head screws (Item 2). The alignment between the upper stamping (Item 3) and lower casting (Item 1), and the gaps of the feeder chutes are factory pre-set. If the screws are loosened, component misfeeding may result. Call your maintenance department if this happens.



**Figure 31** Rear Feeder Half, Inside View, Feeder Identification

**7.1.2 Bulkfeeder Measurements****(Tall 1A, 1B, & 1C):**

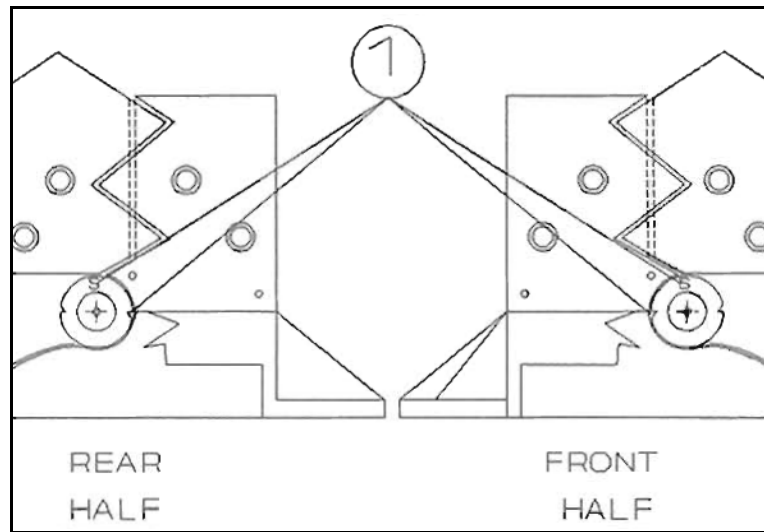
Height .....	10.0"	(254.0 mm)
Length .....	4.25"	(108.0 mm)
Width .....	5.25"	(133.4 mm)
Weight--Actual .....	3.7 lbs	(1.7 kg)
Weight--Shipping .....	6.0 lbs	(2.7 kg)

**(Short 2A, 2B, & 2C):**

Height .....	3.75"	(95.3 mm)
Length .....	4.25"	(108.0 mm)
Width .....	4.25"	(108.0 mm)
Weight--Actual .....	2.5 lbs	(1.1 kg)
Weight--Shipping .....	5.0 lbs	(2.3 kg)

**7.1.3 Cardfeeder Measurements****(Type A, B, & C):**

Height .....	8.0"	(203.2 mm)
Length .....	3.5"	(88.9 mm)
Width .....	5.0"	(127.0 mm)
Weight--Actual .....	2.0 lbs	(0.91 kg)
Weight--Shipping .....	4.0 lbs	(1.80 kg)



**Figure 32** Pick-Up Disk Timing

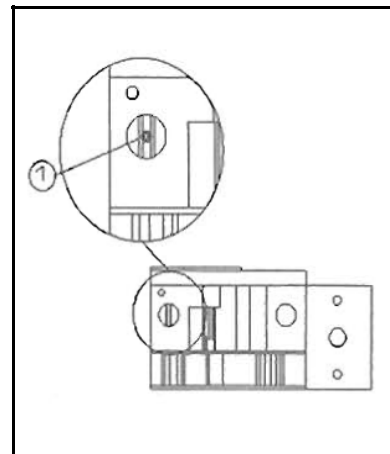
#### 7.1.4

#### Check Pick-Up Disk Timing

Before mounting the feeder, perform the following preliminary steps.

**Figure 32**, Item 1, illustrates the position of the pick-up disks on the base of a feeder. Note the position of the notches and the letters stamped on the disks--when timed properly, the letters and the sharp slopes of the notches will appear in the positions indicated.

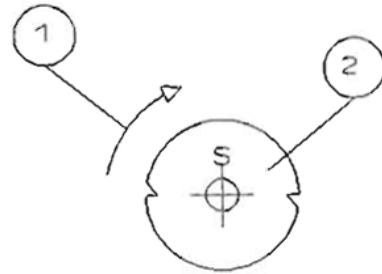
1. Check the timing of the disks by following the steps below:
  - a) Locate round window of top of the rear half of a feeder base as illustrated in **Figure 33**, Item 1.
  - b) Locate the gear tooth with the red-colored notch inside the window.
  - c) Turn the gear under the base of the feeder until the notch appears centered in the round window.
  - d) Check that the position of the pick-up disks are as indicated in **Figure 32** above.
  - e) Follow the same procedure for the other half of the feeder.



**Figure 33** Rear Feeder Half, Top View, Disk Timing

### 7.1.4 Check Pick-Up Disk Timing (continued)

2. Verify disk rotation and timing.
  - a) Check that letters stamped on the disks face out on both front and rear feeder halves as illustrated in **Figure 34**, Item 2.
  - b) For a rear feeder half, check that position of the letter, sharp slopes, notches, and rotation (Item 1) are as illustrated in **Figure 34**.
  - c) For a front feeder, verify that conditions in step "b" above are reversed as illustrated in **Figure 32**, Front Half.



**Figure 34** Pick-up Disk Rotation Direction

3. If disk not timed, re-seat disk on shaft.

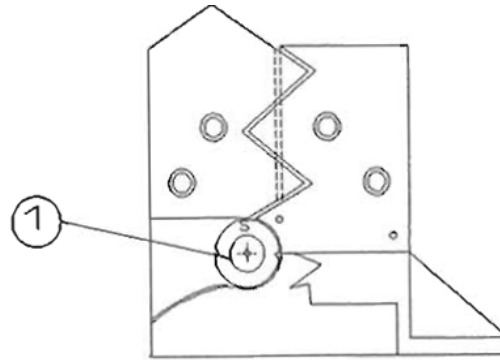
- a) Remove the center screw of the pick-up disk (**Figure 35**, Item 1) and remove disk from shaft.
- b) Turn the gear under the base of the feeder until the notch appears centered in the round window (as per **Figure 33**, previous page).
- c) Replace disk on shaft so that the notches and letter are appropriately positioned as illustrated in **Figure 32**:

- Rear Half

**Or**

- Front Half

- d) Check the timing of the disks as described on previous page, step 1.
- e) Replace and tighten disk center screw.
- f) If necessary, repeat above procedure to re-seat disk on other feeder half.



**Figure 35** Rear Feeder Half, Inside View, Disk Timing

### 7.1.5 Install Feeder

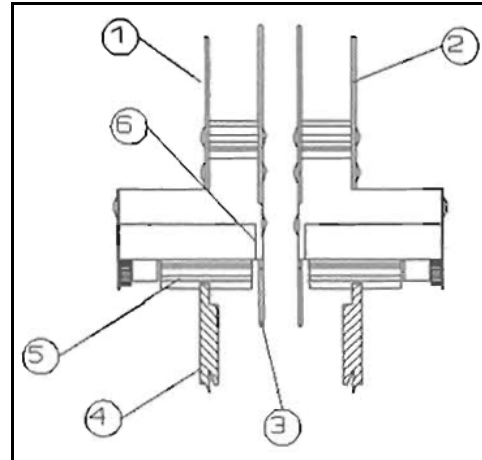
Before mounting the feeders, follow the instructions in *5.0 Set-Up Procedure* to adjust the CF-8 for desired cut and form specifications of the components to be processed.

#### Verify feeder alignment

1. On the rear feeder half, visually check the alignment of the base of the L-shaped stamping (**Figure 36**, Item 3).
2. Verify that stamping is aligned with the fixed casting above it (Item 6).
3. Follow the same procedure to verify alignment of front feeder half.
4. If not aligned, contact maintenance personnel.

#### Install feeder

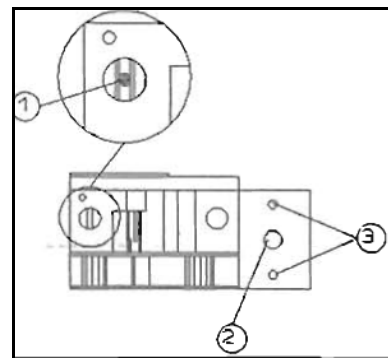
1. Remove dual infeed chute.
2. Place both feeder halves (**Figure 36**, Items 1 & 2) on the same locating dowel pins used with the infeed chute.
3. Verify that the:
  - Gap between the cutting wheels is wide enough to allow smooth insertion of the feeder bases.
  - Position of each feeder L-shaped stamping (Item 3) is between the cutting wheel pair (Item 4).
  - Gear of each feeder base (Item 5) meshes smoothly with the teeth of its cutting wheel (Item 4).
  - Pick-up disks at the base of the feeders are inside the gap between the cutting wheel pair.



**Figure 36** Component Feeder, Left View, Mounting

#### Check timing

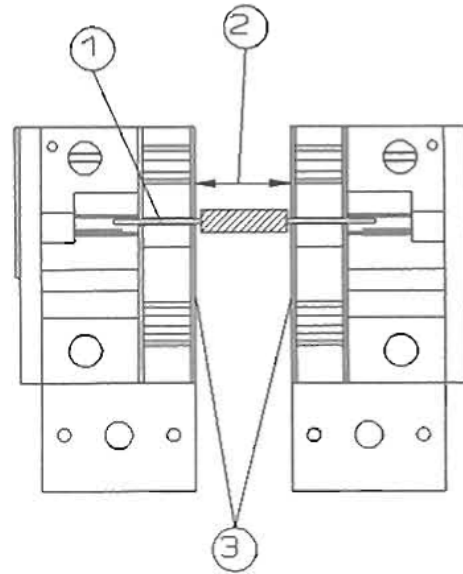
1. Check centering of red notch on gear as illustrated in **Figure 37**, Item 1.
2. If not centered, see previous section 7.1.4 *Check Pick-Up Disk Timing*.
3. Place hex-head cap screw through hole (Item 2) located between dowel pin holes (Item 3) on base of feeder and tighten.
4. Repeat above procedure for the other half of the feeder.



**Figure 37** Rear Feeder Half, Top View, Mounting

### 7.1.6 Adjust Feeder For Component Body Lengths

1. With machine power off, place a sample of components to be processed at the top of the feeder track as illustrated in **Figure 38**, Item 1.
2. Turn Station 1 adjustment knob to adjust the gap (Item 2) between the upright stampings (Item 3) until component slides freely down the track.
3. After initial adjustment, fill feeder to the top of its track with samples of components to be processed.
4. Power on the CF-8 and process the components in the feeder at low speed.
5. Inspect the cut and formed components to ensure they are being processed to your specifications.
  - If the components are not being processed properly, re-check all adjustments.
6. Set the speed of the machine higher for processing.



**Figure 38** Component Feeder, Top View, Body Length Adjustment

**Note:** Processing speed depends on the quality and formed specifications of the components to be processed.

**Note:** All component bodies can vary in body length by up to 5%. As a result, all adjustments are approximations only and variation in the cut and formed components may occur. All clearances down the feeder track are based on square-ended, good quality components. For bulbous-ended components or components of non-uniform length, the clearances may need to be increased. This may result in a corresponding inaccuracy of body centering. Excessive body length clearance coupled with close center-to-center distances may cause component damage.

**Note:** **Do not** operate machine faster than components can be fed into the bulkfeeder or cardfeeder. If the feeder becomes empty of components, turn the machine off and re-load the feeder. Introducing components into an empty feeder while the CF-8 is operating at **any** speed may cause the machine to cut and form components inconsistently.

### 7.1.7 Identify Component Misfeeding Problems

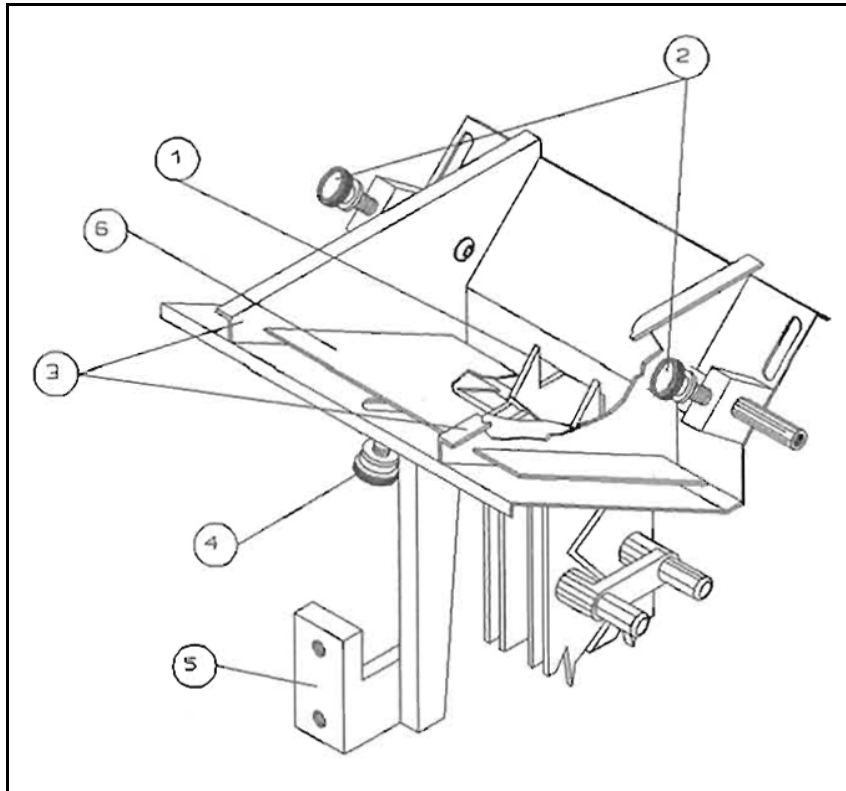
1. Use the chart below to identify the possible component misfeeding problem.
2. Refer to the section in the right half of the chart to correct the problem.

<b>Problem</b>	<b>See Section</b>
Right and left halves of the feeder bases not timed properly to each other.	<i>7.1.4 Check Pick-Up Disk Timing.</i>
Pick-up disks seated incorrectly on their shafts.	<i>7.1.4 Check Pick-Up Disk Timing.</i>
Feeder or hopper adjusted incorrectly for body length.	<i>7.1.6 Adjust Feeder For Component Body Lengths or 7.2 Install Hopper &amp; Arm Assembly.</i>
Odd-shaped components.	<i>7.1.6 Adjust Feeder For Component Body Lengths.</i>
Inconsistent lead centricity.	<i>7.1.6 Adjust Feeder For Component Body Lengths.</i>
Incorrect bulkfeeder for the application.	<i>7.1.1 Feeder Identification &amp; Processing Ranges.</i>

**Chart 17** Component Misfeeding References

## 7.2 Install Hopper & Arm Assembly

An optional hopper is used to present components into a tall version bulkfeeder.



**Figure 39** Optional Bulkfeeder Hopper

### 7.2.1 Install Hopper

1. Lower the hopper onto the top of the installed bulkfeeder.
2. Position the top of the bulkfeeder through the chute at the hopper base as illustrated in **Figure 38**, Item 1.
3. Attach the hopper support arm (Item 5) to the same pad as the reel and tape arm.

### 7.2.2 Adjust Hopper

1. Loosen thumbscrews (Item 2) to adjust for component length and centering.
2. Adjust the side pieces (Item 3) in or out to attain the minimum clearance while allowing the components to drop freely into the bulkfeeder.
3. Loosen gate adjustment thumbscrew (Item 4).
4. Slide the gate (Item 6) up or down to adjust for component body diameter.
5. Adjust the hopper to present components singly and smoothly to the bulkfeeder.
6. Tighten all thumbscrews to lock in adjustments.

## 8.0 Preventive Maintenance

A suggested maintenance schedule in chart form, maintenance steps, and an illustrated quick reference guide are included in this section.

**Warning:** Do not disassemble or remove parts of the CF-8. Changing of transport wheels and dies, and the installation or removal of the infeed chute and its shims are the only parts of the machine the operator should remove.

### 8.1 Preventive Maintenance Schedule

**Note:** Before performing the recommended maintenance, remove any feeders and transport wheels. See *5.0 Set-Up Procedure* for instructions on removing the feeders and wheels.

Service Interval	Location	Blow Dust Off	Wipe Clean	Lubricate (with 5 weight oil) (e.g. 3-in-1)
Daily	All surfaces	✓		
	Die block cranks			✓
	Spindles & shafts			✓
	Stations 6 & 7 slide assemblies			✓
	Stations 8 & 9 adjusting collars			✓
	Stations 4 & 5 dies		✓	

Chart 18 Preventive Maintenance Schedule

## 8.2 Preventive Maintenance Steps

Information pertaining preventive maintenance schedule items are listed here in alphabetic order. See 8.3 *Quick Reference Illustrated Guide* for all figure references in this section.

### All Surfaces

1. Blow dust off all surfaces.
2. Follow the lubrication procedure below since blowing dust off causes the lubricating oil to evaporate.

### Spindles & Shafts Lubrication

1. See 5.4 *Adjust Stations* for information to perform adjustments on the machine.
2. Remove feeders and transport wheels.
3. Adjust Stations 1 through 7 in to minimum settings.
4. Lubricate all spindles and shafts that support moving parts.
  - Avoid over-lubricating. Very little oil is needed.
  - Place oil on shafts and spindles nearest direction of travel. **For example**, with Stations 2 and 3 adjusted in to minimum settings, place oil near the *collar* (**Figure 41**, Item 1). When the Stations are adjusted out, place oil *nearest* the cutting wheels (**Figure 41**, Item 2).
5. Oil the remaining locations with 5 weight oil (e.g. 3-in-1):
  - a) On the main shaft and spindles of the cutting wheels and Stations 2 and 3 as indicated in **Figure 41** shaded areas.
  - b) Where the shafts and spindles meet the infeed chute support blocks (**Figure 40**).

### Cranks, Slide Assemblies, & Adjusting Collars Lubrication

1. Oil the following locations with 5 weight oil (e.g. 3-in-1):
  - a) Where the crank attaches to the die block assemblies of Stations 4 and 5 as indicated in **Figure 42**.
  - b) On the slide assembly and rollers of Stations 6 and 7 die holders as indicated in **Figure 43**.
  - c) Loosen the thumbscrews of Stations 8 and 9 and slide the knurled adjusting collars out from their cranks until they resemble **Figure 44**.
    - 1) Place oil on shaft and on top of each collar, and slide the collars back and forth to distribute the oil.
    - 2) Reassemble by reversing the above steps.
2. After oiling, adjust all Stations out to maximum settings to distribute oil.
3. Re-oil Stations 1 through 7 as indicated in section 8.2 *Preventive Maintenance*, "Spindles & Shafts Lubrication."
4. Adjust all Stations in to minimum settings to distribute the oil.

## 8.2 Preventive Maintenance Steps *(continued)*

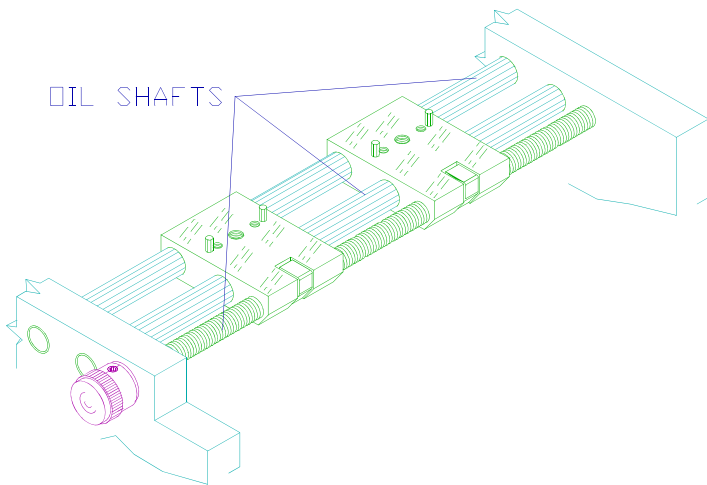
5. Wipe clean any debris and excess oil noticed during the oiling process.

### **Stations 4 & 5 Dies**

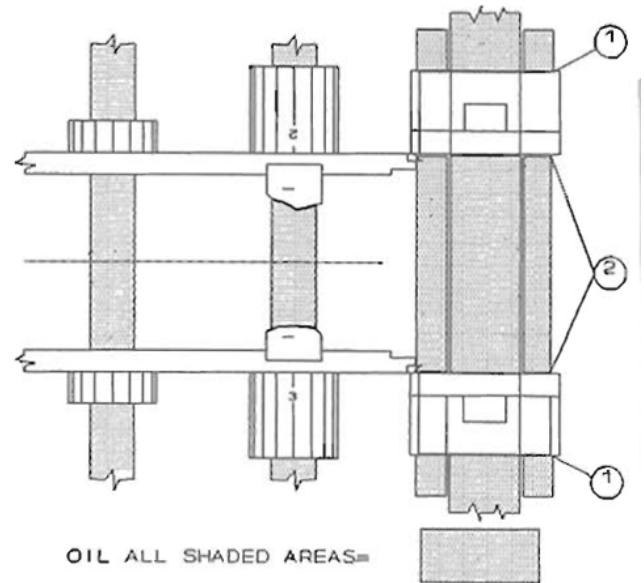
- Wipe clean any debris and oil off the cutting and forming dies in Stations 4 and 5.

### 8.3 Quick Reference Illustrated Guide

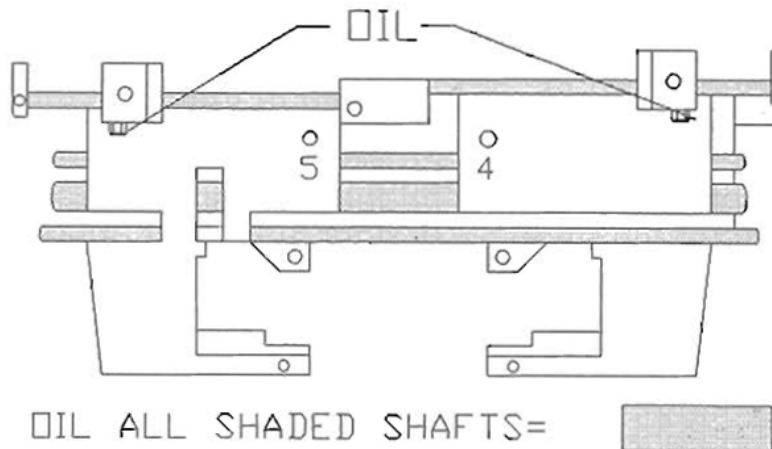
This sections contains five illustrations indicating the recommended oiling locations for Stations 1 through 9.



**Figure 40** Station 1 Oiling Locations, Top View, Dual Infeed Chutes Removed



**Figure 41** Stations 2 & 3 Oiling Locations, Top View



**Figure 42** Stations 4 & 5 Oiling Locations, Front View

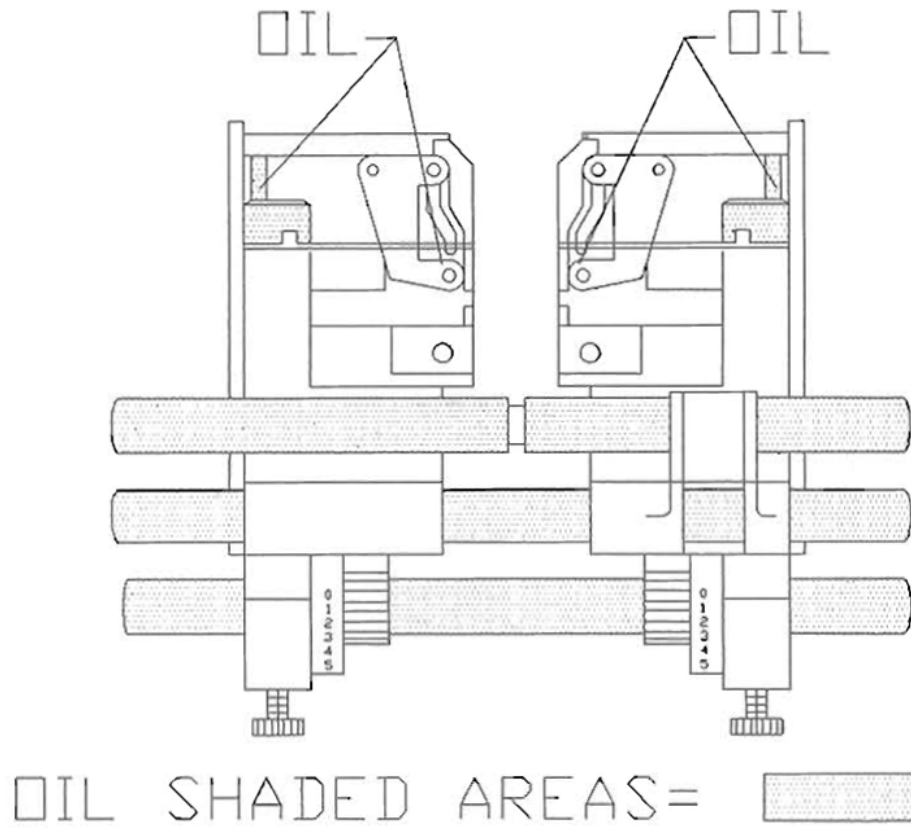


Figure 43 Stations 6, 7, 8, & 9 Oiling Locations, Front View

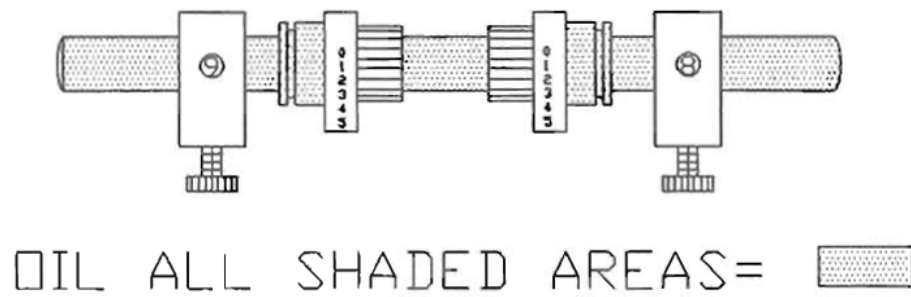


Figure 44 Stations 8 & 9 Oiling Locations, Adjusting Collars, Front View

## 9.0 Troubleshooting

This section contains four charts and an illustrated guide. Use the tables to troubleshoot common operating problems. Use the illustrated guide to troubleshoot common component forming problems.

### 9.1 Machine Not Rotating Properly

Problem	Action
Is the machine jammed with foreign objects?	Turn machine off and clear obstacles.
Is the power supply cord in serviceable condition?	Turn machine off and check cord.
Is the machine plugged into an appropriate, powered outlet?	Turn machine off, check outlet. Call maintenance.
Is the auxiliary plug and footswitch cord inserted properly into the control panel of the machine?	Check that the plug and cord are inserted properly, turn the speed control to a low setting, and depress footswitch.
Is the fuse in the receptacle on the control panel of the machine bad?	Replace fuse.
Are the safety shields open?	Close and secure shields.
Has the reset button on the control panel been depressed?	Press the reset button.
Can you hear noises from <u>inside</u> the machine but the cutting & transport wheels are not rotating?	Call maintenance--the internal clutch or motor belt needs attention.
Are the auxiliary or run mode indicator lights off?	Move the toggle on the control panel to run or auxiliary.

Chart 19 Troubleshooting -- Machine Not Rotating Properly

## 9.2 Machine Rotating Noisily

Problem	Action
Does the sound appear to come from within the cabinet?	Call maintenance.
Are the transport wheels in contact with Stations 6 and 7?	Readjust Stations. See <i>5.4 Adjust Stations</i> .
Are Stations 1, or 2 and 3, adjusted too small for the component body length?	Readjust Stations. See <i>5.4 Adjust Stations</i> .
Is the body length of the component being processed less than .325 inches (8.26 mm)?	Install the smaller ejector blade. See <i>5.3.5 Select &amp; Install Transport Wheel Pair &amp; Component Ejector Blade</i> .
Are the exit chutes rubbing on the cutting wheels?	The exit chutes are out of alignment. Call maintenance.
Are the dies in Stations 4 and 5 a matched set and aligned properly?	Match and align dies. See <i>5.3.1 Select Dies</i> and <i>5.3.4 Install Dies</i> .
Has the machine been serviced at regular intervals?	Perform preventive maintenance. See <i>8.0 Preventive Maintenance</i> .

Chart 20 Troubleshooting -- Machine Rotating Noisily

### 9.3 Components Fall Out of Machine

Problem	Action
Is the wire diameter of the component being processed out the transport wheel's processing range?	Install the proper transport wheels. See <i>5.3.5 Select &amp; Install Transport Wheel Pair &amp; Component Ejector Blade</i> .
Is the wire diameter greater than .029 inches (0.74 mm)?	Install the infeed shims. See <i>5.3.6. Install or Remove Dual Infeed Chute Shims</i> .
Are any of the fingers of the transport wheels obviously bent or broken?	Call maintenance to replace the wheel shims.
Do the components foul in Station 1?	Check the wire diameter processing range, infeed chute adjustment, and reel and tape arm alignment. See <i>5.0 Set-Up Procedure</i> .
Are the transport wheels rotating in the proper direction?	Check the transport wheel installation. See <i>5.3.5. Select &amp; Install Transport Wheel Pair &amp; Component Ejector Blade</i> .
Are the transport wheels timed properly?	Check the timing of the transport wheels. See <i>5.5.3 Select &amp; Install Transport Wheel Pair &amp; Component Ejector Blade, step 2</i> .
Is the speed control of the machine set too high?	Set the machine at a lower operating speed.
Are the dimensions of the component being processed outside the machine's processing range?	Check the component's dimensions. See <i>5.3.3 Observe Processing Limits, step 2</i> .
Are the dies in Stations 4 and 5 installed incorrectly?	Check Stations 4 and 5 die installation. See <i>5.3.4 Install Dies, step 1</i> .
Are the leads of the component bent?	Replace components being processed.

**Chart 21** Troubleshooting -- Components Fall Out of Machine

**Note:** If none of the above solves the problem, call maintenance personnel.

## 9.4 Components Not Forming Properly

Problem	Action
Do the components foul in Station 1?	Check Station 1's adjustment, the component dimensions processing ranges, reel and tape arm alignment, and infeed shim installation. See 5.0 <i>OPERATING INSTRUCTIONS</i> .
Do the cut and formed components resemble any of the components in the illustrations in 9.4.1 <i>Illustrated Guide</i> below?	Follow the instructions to the right of the illustration that looks like the processed component.

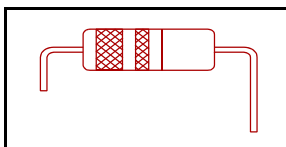
Chart 22 Troubleshooting -- Components Not Forming Properly

### 9.4.1 Illustrated Guide

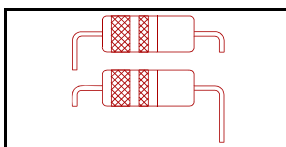
Use this illustrated guide as a quick reference to components not forming properly. Follow the instructions to the right of the illustration that resembles the processed component.

**Note:** Components may have combinations of the problems illustrated below. More than one action may need to be taken to achieve properly cut and formed components.

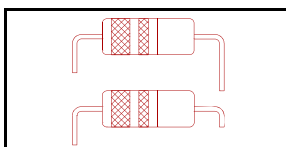
If none of the actions below solve the problem, call maintenance personnel.



..... ▶ **Body centered, uneven leg lengths:** Check Stations 2 & 3 or 4 & 5 settings. See 5.4 *Adjust Stations*.

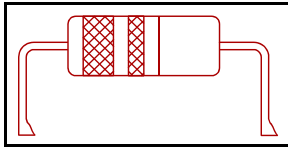


..... ▶ **Body centered, varying uneven leg lengths:** Check Station 1 for too wide of a setting or check for infeed shim installation. See 5.4.5 *Adjust Station 1*.

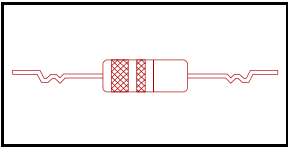


..... ▶ **Body centered, one leg varies in length:** Stations 2, 3, 4, or 5 moving. Not operator adjustable. Call maintenance.

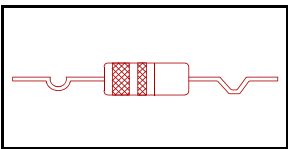
## 9.4.1 Illustrated Guide (continued)



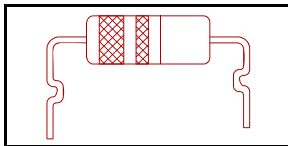
- ..... ▶ **End of lead sheared or not clean cut:** Check die alignment in Stations 4 & 5. See 5.3.4 *Install Dies*. Visually inspect dies for condition of cutting edge. Or if worn knifeholders, call maintenance.



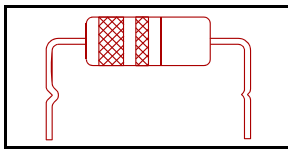
- ..... ▶ **Wire marked near dimple:** Check die size and alignment. See 5.3.1 *Select Dies* and 5.3.4 *Install Dies*.



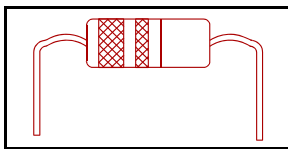
- ..... ▶ **Unmatched dimples in the wire:** Check die size, selection, installation, and that Stations 4 & 5 dies are properly matched. See 5.3 *Select & Install Hardware*.



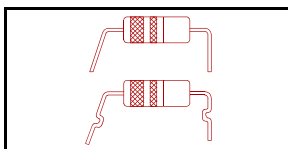
- ..... ▶ **Bend to dimple distance unequal:** Check settings in Stations 4 & 5. See 5.3 *Select & Install Hardware* and 5.4 *Adjust Stations*.



- ..... ▶ **Shallow or insufficient dimple in wire:** Check die selection in Stations 6 & 7. Check all other Station settings. See 5.3 *Select & Install Hardware* and 5.4 *Adjust Stations*.

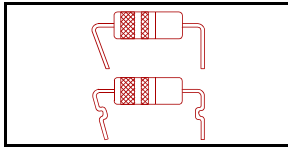


- ..... ▶ **Wire bowed up from body to bend:** Check die alignment and selection. See 5.3. *Select & Install Hardware*.

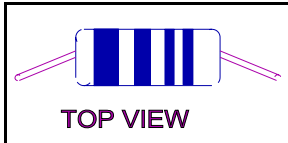


- ..... ▶ **One leg insufficient bend:** Check die installation. Adjust Stations 8 or 9 to a higher setting not to exceed 7. If a higher setting is necessary, call maintenance. See 5.3 *Select & Install Hardware* and 5.4 *Adjust Stations*.

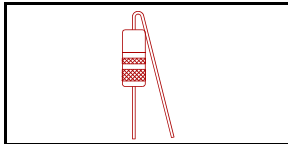
## 9.4.1 Illustrated Guide (continued)



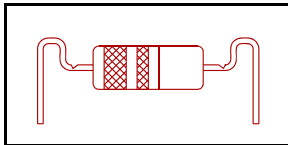
- ..... ▶ **One leg bent too much:** Check die installation. Adjust Stations 8 or 9 to a lower setting. See 5.3 *Select & Install Hardware* and 5.4 *Adjust Stations*.



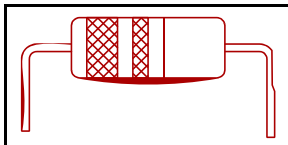
- ..... ▶ **Wire pulled away from body, as seen from the top view:** Check dies for tin build up and scrape off if necessary. Check die installation for alignment. Check die selection for Stations 6 & 7. See 5.3 *Select & Install Hardware*.



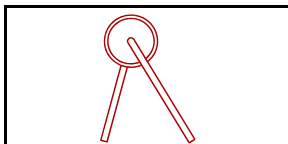
- ..... ▶ **Wire touching body:** Install proper larger die in Stations 6 or 7. See 5.3 *Select & Install Hardware*.



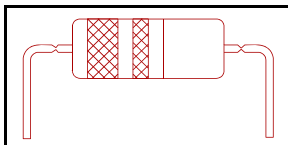
- ..... ▶ **Crimp in wire near bend:** Check die and forming plate selection. See 5.3 *Select & Install Hardware*.



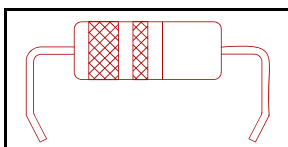
- ..... ▶ **Wires scraped:** Stations 6 & 7 rollers dragging. Not operator adjustable. Call maintenance.



- ..... ▶ **Splayed leads as seen from the side:** Check transport wheel timing. See 5.3.5 *Select & Install Transport Wheel Pair & Component Ejector Blade*, step 2.



- ..... ▶ **Wire marked close to body:** Use next larger transport wheel. Check component's dimension limits. See 5.3.5 *Select & Install Transport Wheel Pair & Component Ejector Blade* and 5.3.3 *Observe Processing Limits*.



- ..... ▶ **Ends of legs bent in:** Adjust Stations 8 or 9 to a lower setting. See 5.4.4 *Adjust Stations 8 & 9*.

## 10.0 Suggested Spare Parts Kits

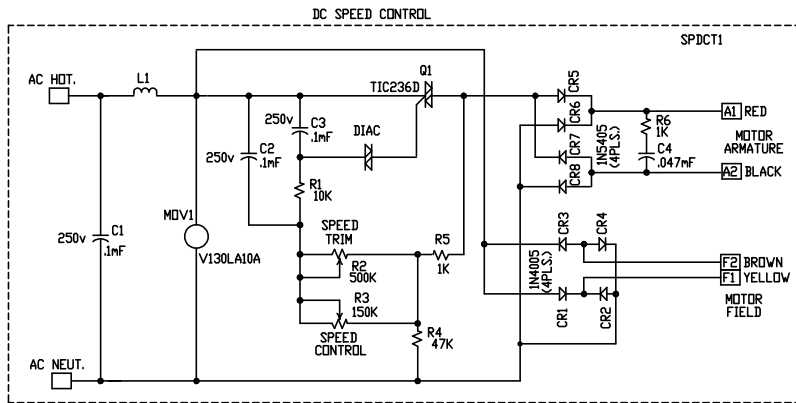
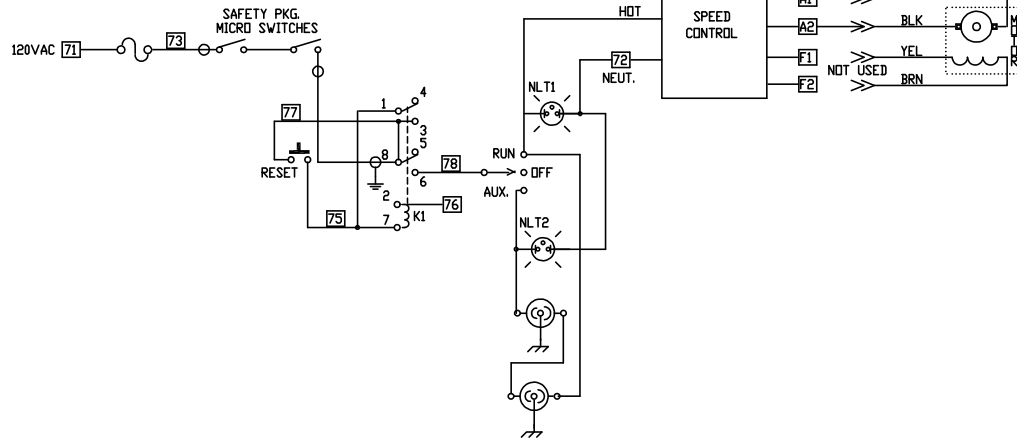
**Note:** Items included in the spare parts kits may be ordered individually.

<b>GPD Part Number</b>	<b>Part Description</b>	<b>Qty.</b>
<b><u>830-1-500</u></b>	<b><u>SPARE PARTS KIT - 120V CF-8</u></b>	<b><u>1</u></b>
D0006	Timing Belt	1
G1001	Retaining Ring 5100-12	As Required
S5003	Spring Plunger S52P	2
S6002	Vlier Wrench VW-52	1
4300-0011	Fuse, Slow Blow	1
801-1-5	Leaf Spring	16
801-1-9	Wire Clamp with Red Insert	2
801-1-19	Pin Die Screws	8
801-1-22	Wireclamp Inserts - Red	4
817-1-3	Wheel Holder	2
817-1-14	Holder Screws	12
817-1-4L	Transport Wheel, Large, Pair	1
817-1-4M	Transport Wheel, Medium, Pair	1
817-1-4S	Transport Wheel, Small, Pair	1
821-4-12	Circlip Pliers	1
<b><u>830-1-510</u></b>	<b><u>SPARE PARTS KIT - 230V METRIC CF-8</u></b>	<b><u>1</u></b>
D0006	Timing Belt	1
G1001	Retaining Ring 5100-12	As Required
S5003	Spring Plunger S52P	2
S6002	Vlier Wrench VW-52	1
4300-0012	Fuse, Slow Blow	1
801-1-5	Leaf Spring	16
801-1-9	Wire Clamp with Red Insert	2
801-1-19	Pin Die Screws	8
801-1-22	Wireclamp Inserts - Red	4
817-1-14	Holder Screws	12
817-1-4L-MET	Transport Wheel, Large, Pair	1
817-1-4M-MET	Transport Wheel, Medium, Pair	1
817-1-4S-MET	Transport Wheel, Small, Pair	1
821-4-12	Circlip Pliers	1

<b>GPD Part Number</b>	<b>Part Description</b>	<b>Qty.</b>
<b><u>830-1-530</u></b>	<b><u>SPARE PARTS KIT - 230V CF-8</u></b>	<b><u>1</u></b>
D0006	Timing Belt	1
G1001	Retaining Ring 5100-12	As Required
S5003	Spring Plunger S52P	2
S6002	Vlier Wrench VW-52	1
4300-0012	Fuse, Slow Blow	1
801-1-5	Leaf Spring	16
801-1-9	Wire Clamp with Red Insert	2
801-1-19	Pin Die Screws	8
801-1-22	Wireclamp Inserts - Red	4
817-1-3	Wheel Holder	2
817-1-14	Holder Screws	12
817-1-4-L	Transport Wheel, Large, Pair	1
817-1-4-M	Transport Wheel, Medium, Pair	1
817-1-4-S	Transport Wheel, Small, Pair	1
821-4-12	Circlip Pliers	1
<b><u>830-1-520</u></b>	<b><u>SPARE PARTS KIT - 100V METRIC CF-8</u></b>	<b><u>1</u></b>
D0006	Timing Belt	1
G1001	Retaining Ring 5100-12	As Required
S5003	Spring Plunger S52P	2
S6002	Vlier Wrench VW-52	1
4300-0011	Fuse, Slow Blow	1
801-1-5	Leaf Spring	16
801-1-9	Wire Clamp with Red Insert	2
801-1-19	Pin Die Screws	8
801-1-22	Wireclamp Inserts - Red	4
817-1-3	Wheel Holder	2
817-1-14	Holder Screws	12
817-1-4L-MET	Transport Wheel, Large, Pair	1
817-1-4M-MET	Transport Wheel, Medium, Pair	1
817-1-4S-MET	Transport Wheel, Small, Pair	1
821-4-12	Circlip Pliers	1

**Appendix A Electrical Diagram & Schematics**

Electrical Schematic ..... 00010-008-000-00-0088001A



**GPD GLOBAL**

CUSTOMER:	DRAWN: SAH	DATE: 04-05-07	THIS ASSEMBLY: ELE SCHEMATIC	NAME: CF-8	DRWG NUMBER: 00010-008-000-00-0088001A
-----------	------------	----------------	------------------------------	------------	--

## Index

Accessories .....	4-1
Adjust Stations .....	5-3, 5-22, 5-23, 5-28, 8-2, 9-2, 9-4, 9-5, 9-6
For Component Body Length and Centering .....	5-24
For Crimp Position .....	5-22
For Desired Cut Length .....	5-22
For Placement of the Bend on the Component Legs .....	5-22
If Too Little Loop .....	5-23
If Too Much Loop .....	5-23
To Form Horizontal Components .....	5-23
To Form Vertical Components .....	5-23
Adjustments .....	3-1, 5-3, 5-8, 5-9, 5-10, 5-11, 5-13, 5-23, 5-25, 5-26, 5-28, 6-1, 7-7, 7-9, 8-2
Axial Component Forms .....	1-1
Bulkfeeder .....	1-1, 5-1, 5-27, 6-1, 7-1, 7-2, 7-3, 7-7, 7-8, 7-9
Bulkfeeder & Cardfeeder Set-Up .....	5-27, 6-1, 7-1
Calculations	
Horizontal Flush-Mount .....	5-8, 5-9
Horizontal Stand-Off .....	5-10
Vertical Flush-Mount .....	5-11
Vertical Stand-Off .....	5-12, 5-13
Calculator Software Package .....	5-8
Cardfeeder .....	1-1, 5-1, 5-27, 6-1, 7-1, 7-2, 7-3, 7-7
Caution .....	3-1, 5-4, 5-23
Component	
90 Degree Bends .....	5-1, 5-22, 5-23
Bend Radius .....	2-9
Body Diameter .....	2-8, 5-9, 5-10, 5-11, 5-12, 5-13, 5-14, 5-15, 7-9
Body Length .....	2-8, 5-2, 5-8, 5-9, 5-10, 5-11, 5-12, 5-13, 5-14, 5-15, 5-24, 7-7, 7-8, 9-2
Center to Center .....	2-8, 5-2, 5-8, 5-9, 5-10, 5-11, 5-12, 5-13, 5-14, 5-15
Crimp Height .....	2-9
CTC .....	2-8, 5-9, 5-10, 5-11, 5-12, 5-13, 5-14
Cut Length .....	5-2, 5-11, 5-22, 5-25
Dimension Limits .....	5-5, 5-14, 5-15, 9-6
Elements .....	2-8, 2-9, 5-1, 5-2, 5-8
Leg Length .....	2-8
Minimum Center to Center .....	5-15
Processing Ranges .....	2-8, 2-9, 5-7, 5-19, 7-1, 7-2, 7-8, 9-4

Component (continued)	
Wire Diameter . . . . .	2-8, 5-6, 5-7, 5-8, 5-9, 5-10, 5-11, 5-12, 5-13, 5-14, 5-15, 5-18, 5-19, 5-21, 5-24, 5-28, 7-2, 9-3
Wire Diameter Processing Ranges . . . . .	5-7, 5-19
Wire Length . . . . .	2-8
Danger . . . . .	3-1, 4-2
Die	
Die Markings . . . . .	5-7, 5-16
Die Type . . . . .	5-6, 5-7, 5-28
Die Width . . . . .	5-7, 5-8, 5-9, 5-10, 5-11, 5-12, 5-13, 5-14
Pin Diameter . . . . .	5-7, 5-8, 5-9, 5-10, 5-11, 5-12, 5-13, 5-14
Secondary Cut-Off . . . . .	5-9, 5-11, 5-13, 5-17, 5-22
Variable Values . . . . .	5-10, 5-12
Dual Infeed Chutes . . . . .	2-1, 5-1, 5-21, 8-4
Formula Calculator Package . . . . .	5-8
Footswitch . . . . .	4-1, 4-3, 9-1
Guide to the Forming Process . . . . .	5-1
Initial Set-Up . . . . .	5-3, 5-4, 5-22, 5-28
Install Dies . . . . .	5-5, 5-16, 5-17, 5-18, 5-28, 9-2, 9-3, 9-5
In Stations 4 & 5 . . . . .	5-9, 5-10, 5-11, 5-13, 5-16, 9-5
In Stations 6 & 7 . . . . .	5-17, 9-5
Install Shims . . . . .	5-21, 5-24
Installation	
Front & Rear Safety Guards . . . . .	4-2
Reel Arm Holder . . . . .	4-2
Installation Procedure . . . . .	4-1, 5-17, 5-18
Method Of Operations . . . . .	5-1, 5-2
Operating Instructions . . . . .	1-1, 6-1, 9-4
Operation Sequence . . . . .	5-1
Operator Safety . . . . .	3-1
Optional Feeder Identification . . . . .	7-2
Options . . . . .	4-2, 5-1, 7-1, 7-2
Part Identification . . . . .	2-1, 2-2, 2-3, 2-4, 2-5, 2-6, 5-1, 5-2, 5-3, 5-22, 6-1
Power Off . . . . .	5-3, 6-1, 7-7
Power On . . . . .	3-1, 6-1, 7-7
Power Supply . . . . .	1-1, 3-1, 6-1, 9-1
Preventive Maintenance . . . . .	8-1, 8-2, 8-3, 9-2

Processing Limits .....	5-14, 5-15, 5-28, 9-3, 9-6
Remove Shims .....	5-24
Safety Instructions .....	3-1, 6-1
Safety Switch .....	2-1, 2-3
Select Dies .....	5-5, 5-6, 5-7, 5-8, 5-28, 9-2, 9-5
For Stations 4 & 5 .....	5-6
For Stations 6 & 7 .....	5-7, 9-6
Service Department .....	4-1
Set-Up Procedure .....	3-1, 5-1, 6-1, 7-6, 8-1, 9-3
Shipping Damage .....	4-1, 7-1
Spare Parts .....	7-1, 10-1, 10-2
Specifications .....	2-1, 2-7, 5-25, 5-26, 6-1, 7-2, 7-6, 7-7
Station Function .....	5-2
Station Settings .....	5-5, 5-7, 5-8, 5-9, 5-10, 5-11, 5-13, 5-14, 5-22, 5-25, 5-28, 6-1, 9-5
Taped Components	
Install, Adjust, and Process .....	5-26, 5-28
Tool Change Setting .....	5-3
Transport Wheels	
Dowel Storage .....	5-4
Rubber Pads .....	5-9, 5-10, 5-11, 5-13
Store .....	5-4
To Avoid Damaging .....	5-9, 5-10
Warping or Damaging .....	5-4
Troubleshooting .....	5-23, 5-25, 9-1, 9-2, 9-3, 9-4
Warning .....	3-1, 5-3, 5-25, 8-1
Warranty .....	ii