



**AMC-2000**  
**ENVELOPE FEEDER**

**SERVICE MANUAL**

THE AMC-2000 SERVICE MANUAL WAS DEVELOPED WITH THE FOLLOWING CONSIDERATIONS FOR THE TECHNICAL REPRESENTATIVE:

- ◆ TO COVER ALL AMC-2000 SERIES ENVELOPE FEEDERS.
- ◆ TO PROVIDE THE TECHNICAL REPRESENTATIVE WITH ALL OF THE INFORMATION ABOUT THE AMC-2000 THAT WAS AVAILABLE AT THE TIME OF PRINTING.
- ◆ TO PRESENT THE MANUAL USING A FORMAT THAT WOULD MAKE INFORMATION EASY TO FIND, UNDERSTAND, AND USE.

YOUR THOUGHTS AND COMMENTS ABOUT THIS MANUAL WOULD BE APPRECIATED FOR THE DEVELOPMENT OF FUTURE EDITIONS.

## **SAFETY PRECAUTIONS**

THIS EQUIPMENT PRESENTS NO PROBLEM WHEN USED PROPERLY. HOWEVER, CERTAIN SEFETY RULES SHOULD BE OBSERVED WHEN OPERATING THE AMC-2000.

1. Keep hands, hair, and clothing clear of rollers and other moving parts.
2. Always turn off the machine before making adjustments, cleaning the machine, or performing any maintenance.
3. Turn power off when not in use.
4. If you have any questions contact Astro Machine Corporation before making any of the adjustments outlined in this manual.

## **CAUTION**

**THIS EQUIPMENT MUST BE CONNECTED TO A PROPERLY GROUNDED OUTLET. FAILURE TO DO SO CAN CAUSE ELECTRICAL SHOCK!**

### **POWER REQUIREMENTS**

MODEL AMC-2000 — 115 VAC; 10 AMP; 60 Hz

MODEL AMC-2000 — 220 VAC; 6 AMP; 50/60 Hz

POWER CONSUMPTION — .450 KW/HR.

IN ADDITION OT THE BASIC HAND TOOLS, THE FOLLOWING ARE REQUIRED TO CALIBARATE THE FEEDER.

1 – FEELER GAGE SET

2 – SPRING SCALE 0-100 OZ.

This manual is intended solely for the use and information of Astro Machine Corporation, its designated agents, customers, and their employees. The information in this guide was obtained from several different sources that are deemed reliable by all industry standards. To the best of our knowledge, that information is accurate in all respects. However, neither Astro Machine Corporation nor any of its agents or employees shall be responsible for any inaccuracies contained herein.

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## **Section 1 – FUNCTIONAL OPERATION**

### **INTRODUCTION TO FUNCTIONAL OPERATION**

The following explains the function of various components of the AMC-2000 envelope feeder. The explanations are made assuming that all parts are adjusted and in working condition.

The Model AMC-2000 envelope feeder operates on a concept of feeding that is most efficient for the operator's needs. This concept of top-load bottom-feed assures the operator of virtually zero downtime. The photoelectric sensor located at the front of the envelope feeder is the prime element in the timing of the envelope feeder. The moment the envelope is picked up from the conveyor board of the envelope feeder, a signal is generated to feed the next envelope. When the feeder gets the signal, it follows a pattern of sequences that prepare the next envelope for register prior to entering the gripper fingers of the duplicator.

These sequences are as follows:

1. Once the envelope is signaled to feed, the suction bar, equipped with four suction valves, draws the envelope down far enough so the aluminum upper pull-out roller (pinch roller) can take over the forwarding of the envelope onto the conveyor of the feeder.
2. When the envelope reaches the first wheel of the register bar, the forward drive of the envelope is then completed by the pressure of the paper retainer straps against the conveyor tapes, which are in motion.
3. The push guide of the feeder registers the envelope. This feed cycle ensures the envelope is registered before entering the duplicator. Once the duplicator picks up the envelope, the sensor signals the electromechanical clutch inside the feeder to forward another envelope onto the conveyor of the feeder. This concept of feeding ensures trouble free synchronization between the feeder and the duplicator.

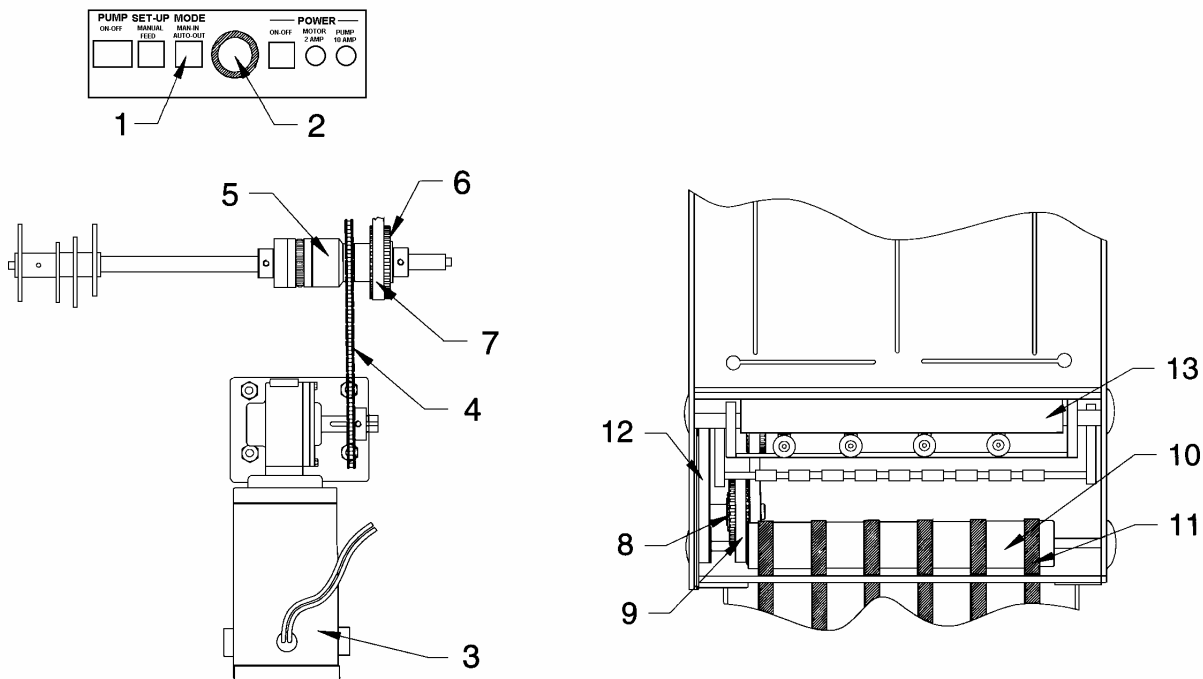
These three points outline the basic feeding concept of the Model AMC-2000 envelope feeder.

## VARIABLE SPEED DRIVE – MANUAL MODE

**PURPOSE:** Provides drive and variable speed to all mechanisms of the feeder.  
**Used for setup.**

### **FUNCTION:**

1. Power turned ON, **MODE** switch [1] pressed IN. (MANUAL MODE)
2. Speed Control [2] controls the speed of the motor [3].
3. Motor [3] turns causing chain [4] to turn the clutch-sleeve [5] with pulley [6] and sprocket.
4. As the pulley [6] turns, the belt [7] drives the double pulley [8]. The function of the double pulley is to provide correct speed ratio between clutch and rollers [10] and [13].
5. The double pulley [8] also drives the rear conveyor roller [10] by way of belt.
6. Rear conveyor roller provides drive to conveyor roller and taper [11], and lower pull out roller [13].

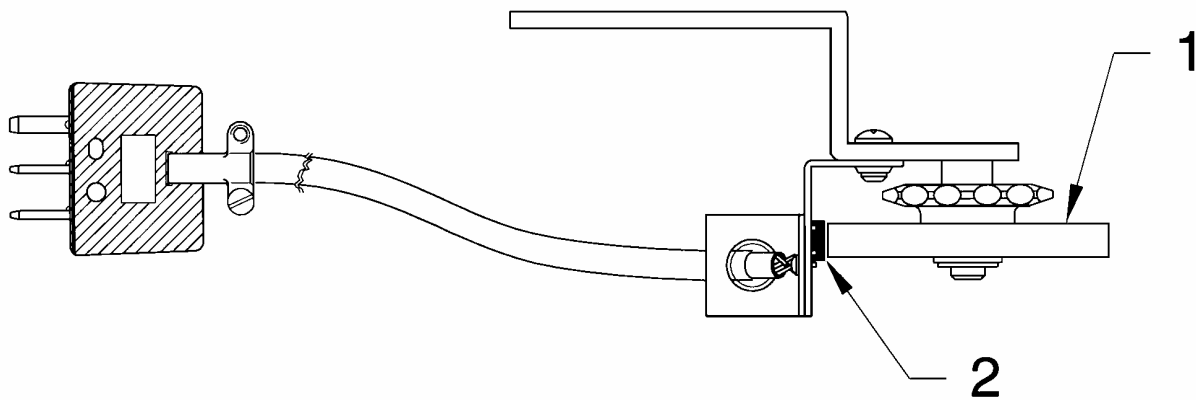


## VARIABLE SPEED DRIVE – AUTOMATIC MODE

**PURPOSE:** Provides drive and variable speed to all mechanisms of the feeder.  
**Used for automatic feeding.**

### **FUNCTION:**

1. Power turned ON **MODE** switch NOT depressed. (AUTOMATIC MODE)
2. The duplicator is turned on and drives the pulse generator.
3. The pulse wheel [1] rotates and its magnetic code points pass in front of the hall-effect transistor [2] causing it to turn **ON** and **OFF**.
4. These **ON/OFF** signals are sent to the circuit board where the frequency of these signals is converted to a corresponding D.C. voltage level used to drive motor.
5. The speed of the feeder is determined by the pulse generator, which is controlled by the duplicator speed.
6. The functional operation of the mechanical drive is the same as in manual mode. See *Variable Speed Drive-Manual Mode*, points 3 through 6.

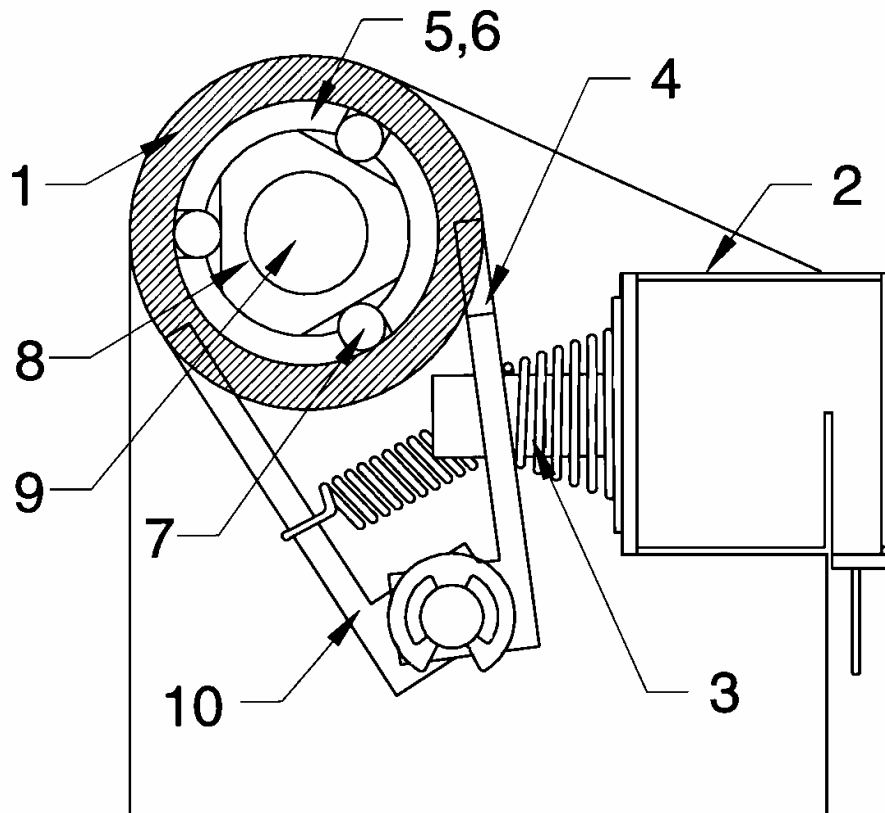


## CLUTCH (S/N 1001 – 3479)

**PURPOSE:** Engages the cam shaft with the drive motor to cycle, picking up an envelope and forwarding it, then jogging it.

### **FUNCTION:**

1. Clutch-sleeve [1] is driven directly by the motor and always turns.
2. When solenoid [2] is energized it pulls plunger [3]. Connected to the plunger is a pawl [4], which is pivoted.
3. Pawl [4] releases roller-cage [5] which is then forced by spring [6] to turn with clutch-sleeve.
4. The moving roller-cage [5] engages three rollers [7] until they are jammed between clutch-sleeve and the flats on the clutch body [8].
5. Rollers engage the clutch-sleeve with the clutch body. Attached to the clutch body is the cam shaft [9]. Cam-shaft is now rotated.
6. After 1/10-second delay the solenoid is de-energized and the Pawl [4] is moved back to rest on the roller-cage [5] by return spring [6].
7. When the clutch makes one revolution, the pawl [4] fall into a notch in the roller-cage [5] causing the cage to stop.
8. Once stopped, the cage forces the rollers out of contact with the clutch body and clutch-sleeve, disengaging them.
9. The clutch is now in the idle stage until the next energizing of the solenoid.
10. Pawl [10] prevents clutch backlash.

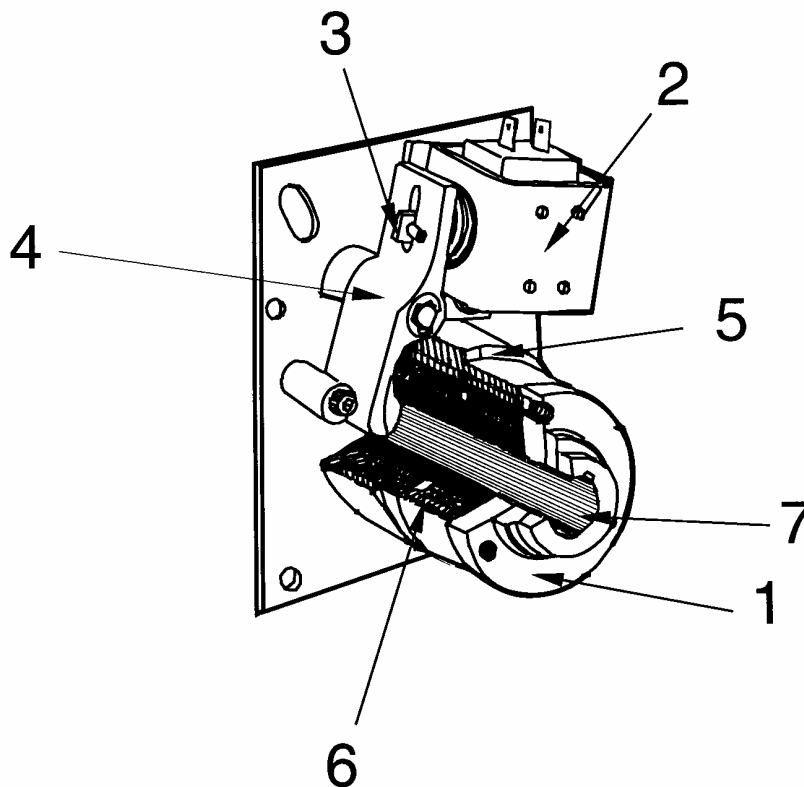


## **CLUTCH** (S/N 3480 – UP)

**PURPOSE:** Engages the cam shaft with the drive motor to cycle, picking up an envelope and forwarding it, then jogging it.

### **FUNCTION:**

1. Clutch sprocket-coupling [1] is driven directly by the motor and always turns.
2. When solenoid [2] is energized it pulls plunger [3]. Connected to the plunger is a pawl [4], which is pivoted.
3. Pawl [4] releases the internal clutch control collar [5], which is then forced by spring [6] to turn.
4. Drive spring [6] in its relaxed position grips clutch-sleeve and camshaft [7] causing them to turn with the motor.
5. Solenoid [2] is de-energized releasing pawl [4] and allowing it to ride on the control collar [5].

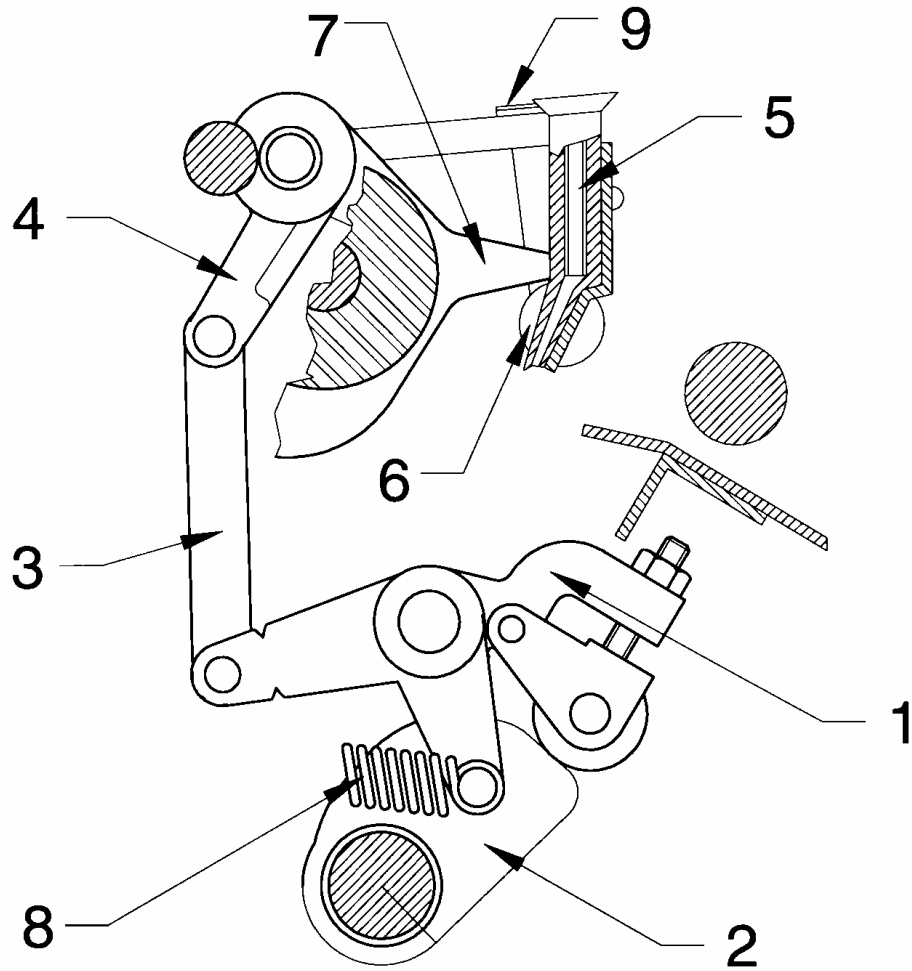


## ENVELOPE FEED – SUCTION CUP CARRIAGE

**PURPOSE:** Allows suction cups to have vertical and horizontal movement.

**FUNCTION:**

1. When the clutch is engaged, the camshaft with cams turns.
2. Truck and lever [1] follow cam [2].
3. Link [3] pivots lever [4], which moves the suction-cup carriage [5].
4. As the suction-cup carriage [5] is moved both cam followers [6] ride on stationary cams [7].
5. Springs [8] and [9] hold trucks against cams.

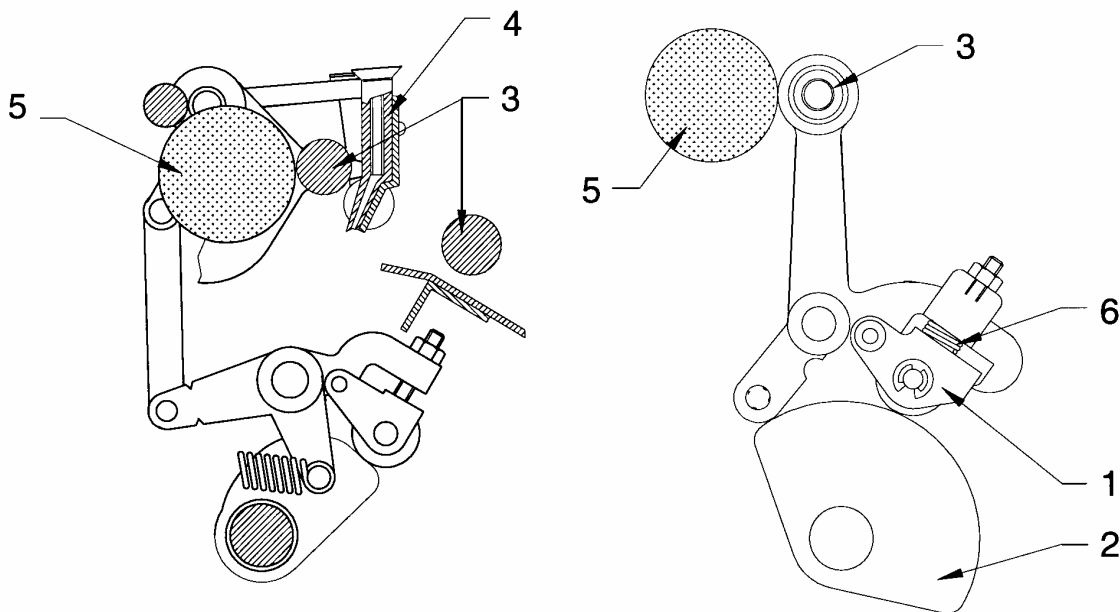


## ENVELOPE FEED – UPPER PULL-OUT ROLLER

**PURPOSE:** To forward envelope onto the conveyor.

**FUNCTION:**

1. When the clutch is engaged, the camshaft with cams turns.
2. Trucks and levers [1] follow cams [2], which begin moving the upper pull-out roller [3].
3. Suction-cup carriage [4] moves envelope below upper pull-out roller [3], trucks and levers [1] continue to follow *high point* of cams [2] pressing upper pull-out roller [3] against lower pull-out roller [5].
4. The upper and lower pull-out roller [3] and [5] then forward the envelope onto the conveyor.
5. Pressure between pull-out rollers is maintained by springs [6].
6. Upper pull-out roller [3] is moved from the lower pull-out roller [5] when trucks and levers [1] are on the *low point* of the cam.

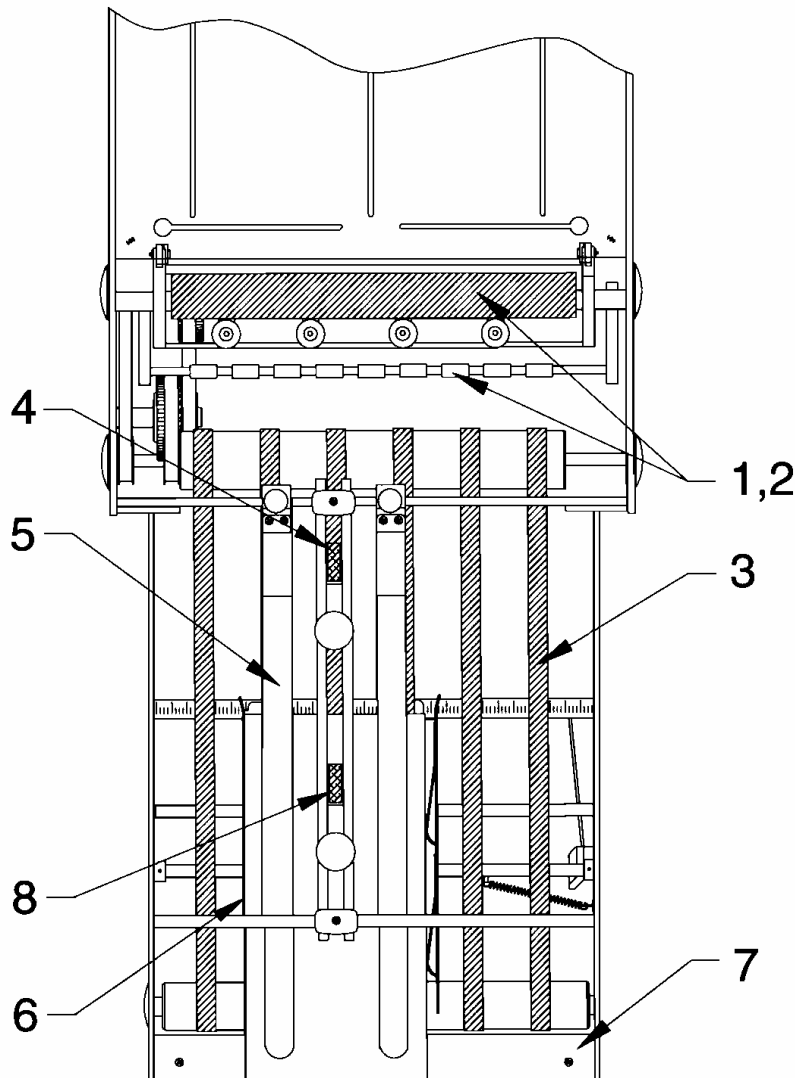


## CONVEYOR

**PURPOSE:** Ensures that the envelope is jogged and transported within reach of duplicator suction cups.

### **FUNCTION:**

1. Power ON drives the motor.
2. The pull-out roller [1] and [2] forward the envelope to the conveyor tapes [3].
3. Once the envelope reaches the first wheel of the register bar [4], the forwarding function is taken over by the pressure of the paper retainer straps [5] and the register bar on the moving conveyor tapes [3].
4. At this point the envelope is jogged by the push guide [6]
5. At the end of travel, the envelope is stopped by the front feed-plate [7] awaiting pick-up by the duplicator.
6. The second wheel [8] is positioned by the operator to prevent envelope backlash once it reaches the front feed plate.

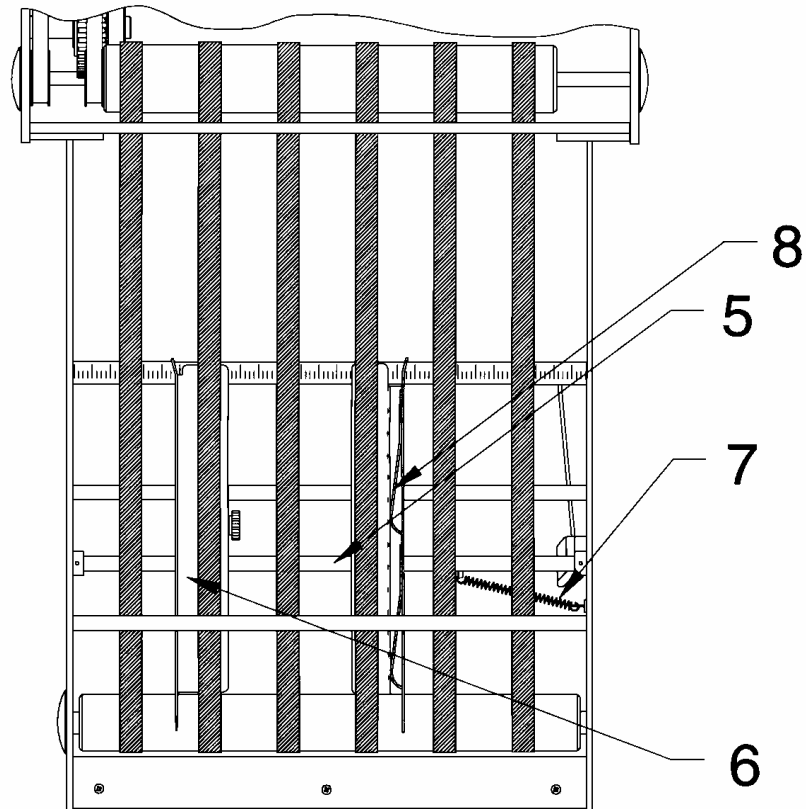
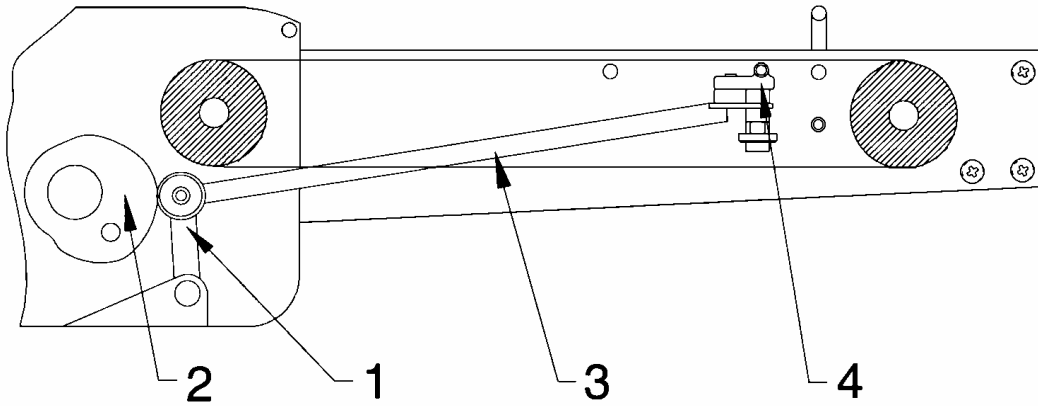


## ENVELOPE JOGGING

**PURPOSE:** Preparing the envelope for registration.

**FUNCTION:**

1. Power ON with clutch engaged.
2. Truck and lever [1] move to *high point* of the cam [2] causing link [3] and lever [4] to move rod [5] with guide [6].
3. When truck and lever [1] move to *low point* of the cam [2], spring [7] returns rod [5] with guide [6] to align the envelope with sprint plate [8].

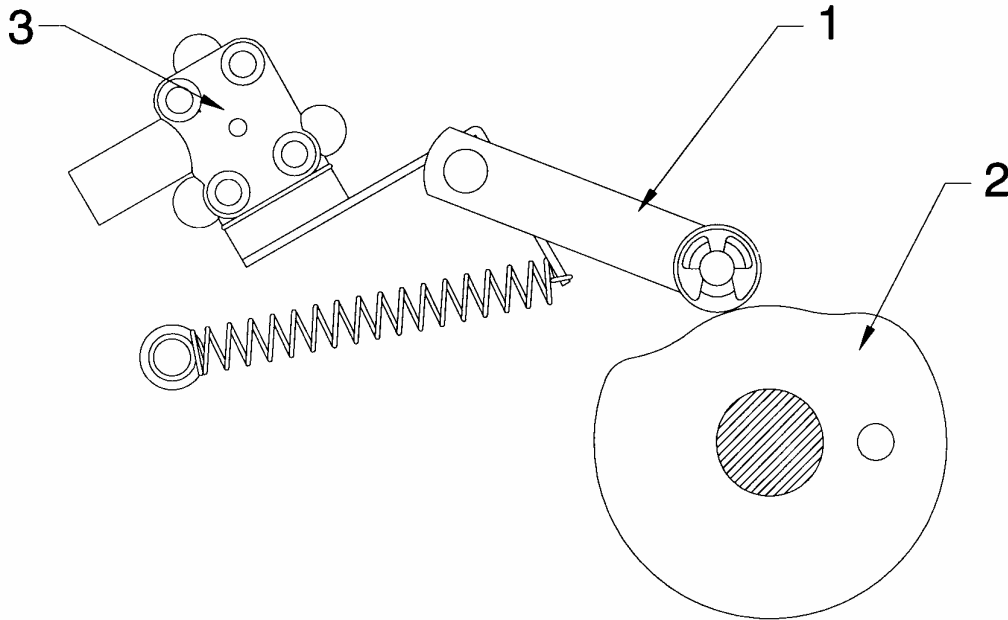


## VACUUM MAKE-AND-BREAK VALVE

**PURPOSE:** To pick up and release envelope.

**FUNCTION:**

1. As the suction cup carriage is raised, lever [1] moves to *low point* of cam [2] closing the valve [3] opening.
2. Suction is created when valve [3] is closed then bottom envelope is brought down.
3. When the envelope has been moved between pull-out rollers, lever [1] moves to high point of cam [2], opening the valve.
4. Opening of valve [3] breaks the vacuum, which allows suction cups to release the envelope.

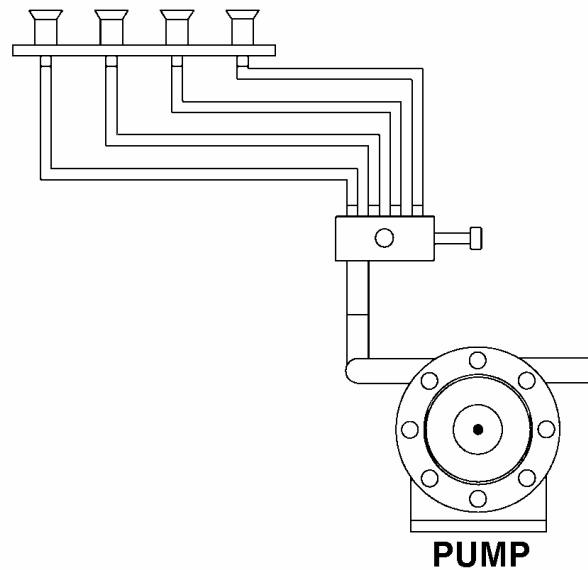


## VACUUM SYSTEM

**PURPOSE:** Controls vacuum for use in the feeder.

**FUNCTION:**

1. Air is pulled into compressor through the suction cups, make-and-break valve, and the vacuum adjustment valve.

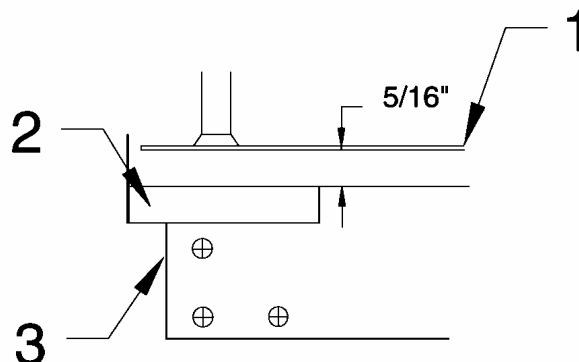


## PHOTOSENSOR

**PURPOSE:** Timing the feeder with the duplicator.

**FUNCTION:**

1. Envelope [1] is lifted up from the front feed-plate [2] by the duplicator. Photosensor [3] measures the distance between the envelope and the surface of the front feed-plate [2] by reflecting infrared light.
2. When the envelope is lifted up about 5/16" over the front feed-plate, the PC Board energizes the clutch solenoid and the feeder makes a cycle forwarding another envelope to replace the one just fed into the duplicator.





## **Section 2 – ADJUSTMENTS**

### **WARNING**

**FEEDER MUST BE UNPLUGGED FROM THE POWER OUTLET WHILE MAKING ADJUSTMENTS. IF ANY ADJUSTMENT PROCEDURE REQUIRES THE FEEDER TO BE TURNED ON, PLUG IT IN AND IMMEDIATELY UNPLUG IT WHEN THE ADJUSTMENT IS COMPLETED.**

### **INTRODUCTION**

Operating adjustments are not discussed in this manual. The following adjustments are those which should be made by the technical representative. To make the best use of this section of the manual, work as follows:

**BEFORE MAKING ANY ADJUSTMENTS, MAKE SURE ALL PARTS ARE IN WORKING CONDITON.**

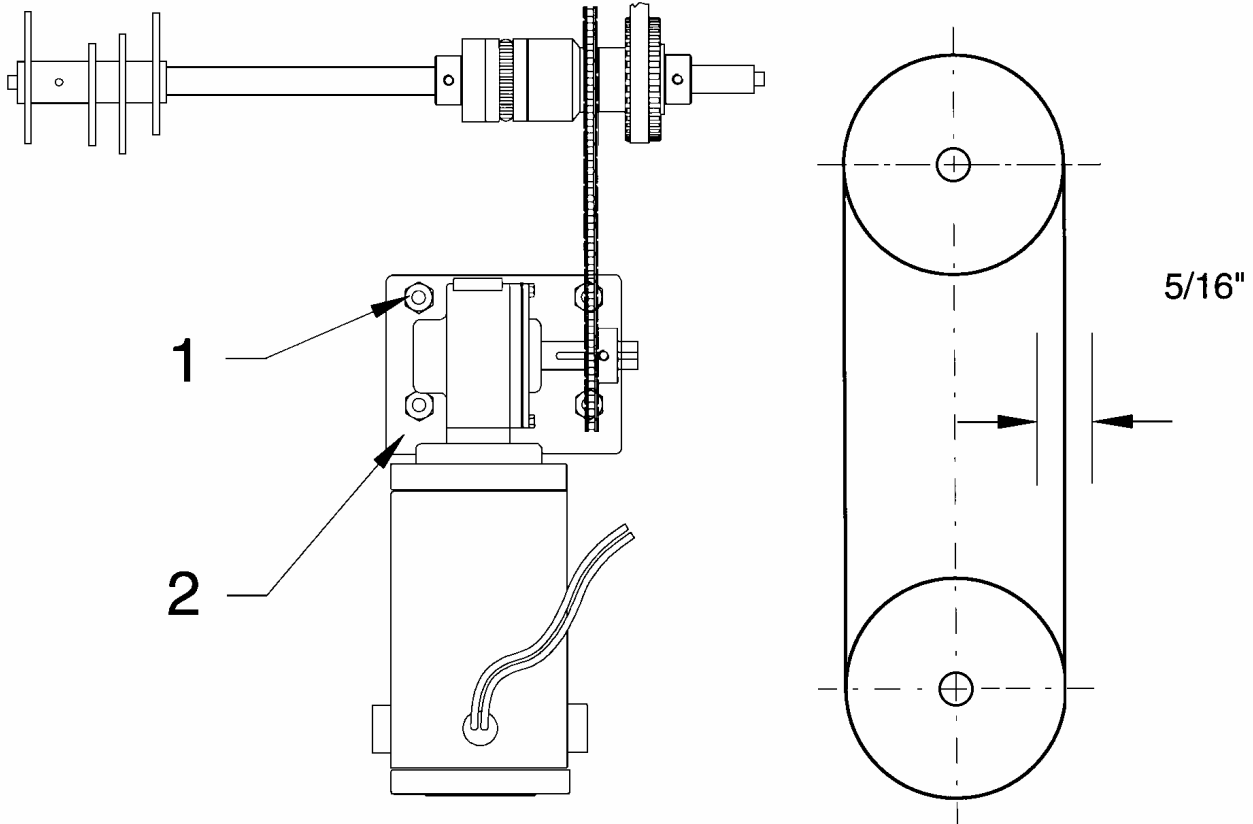
1. Read the requirement to find out what is expected of the adjustment.
2. Read the adjustment procedure.
3. After reading the procedure, if the requirement is met, go no further.
4. If the requirement is not met, make the adjustment.

## **DRIVE CHAIN**

**REQUIREMENT:** Chain should have no more than 5/16" slack in the middle.

### **ADJUSTMENT:**

1. Loosen 4-carriage bolts [1] on the motor adjusting plate [2].
2. Adjust plate [2] for 5/16" slack in the middle of the chain.
3. Tighten carriage bolts [1].

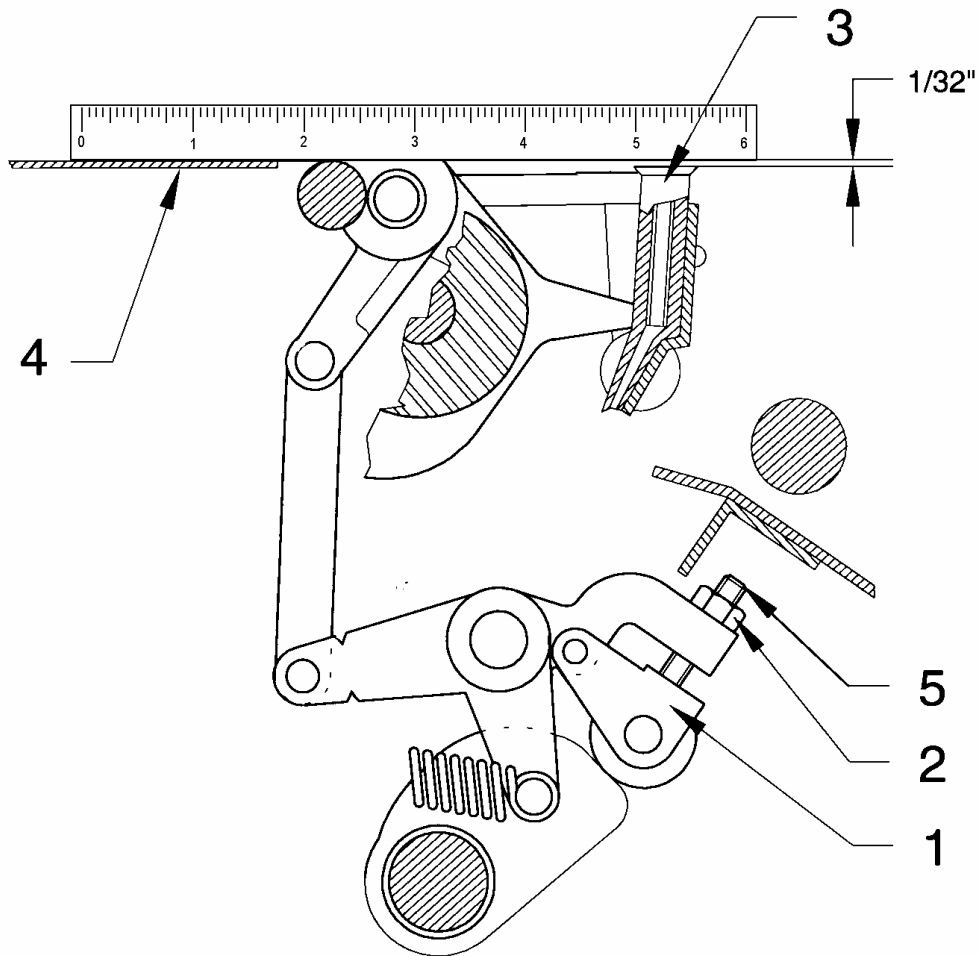


## SUCTION-CUP CARRIAGE

**REQUIREMENT:** To assure accurate feeding, the suction-cup carriage must be maintained at the correct feeding height and tilt.

### **ADJUSTMENT:**

1. Turn the camshaft so truck [1] is on *high point* of cam.
2. Loosen lock nut [2].
3. Remove rubber cup from one suction foot [3], and then position a six-inch (125-mm) steel ruler on the platform [4].
4. Adjust screw [5] so clearance between ruler and the suction foot is  $1/32''$  (0.8 mm). The top surface of suction foot should be parallel to the edge of the ruler.
5. Turn feeder ON. Set **MODE** switch to **MANUAL**, speed control to maximum, and depress the **SETUP** switch.
6. When the envelope feeder makes a full cycle, switch the power to OFF.
7. Recheck suction foot clearance and tighten lock nut [2].



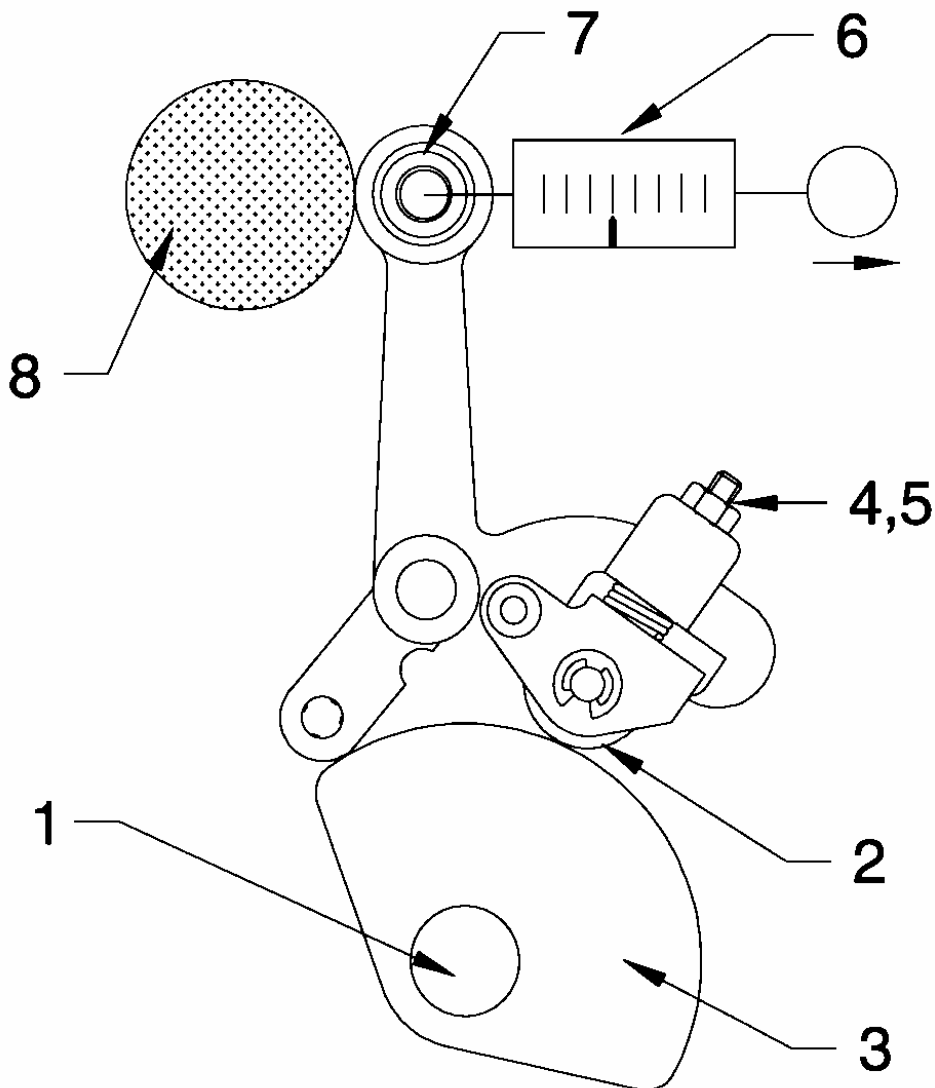
## UPPER PULL-OUT ROLLER PRESSURE SPRINGS

**REQUIREMENT:** Springs should provide equal and adequate pressure along the pull-out rollers.

### **ADJUSTMENT:**

1. Turn camshaft [1] to a point where trucks [2] are on *high point* of cams [3].
2. Loosen nut [4] on adjusting screw [5]. Apply a 48 oz. ( $\pm 5$  oz.) load [6] to end of the upper pull-out roller [7].
3. Adjust screw [5] so upper pull-out roller [7] just breaks contact with the lower pull-out roller [8].
4. Repeat steps 2 and 3 on the other end of the upper pull-out roller [7].
5. Tighten lock nut [4].

**NOTE:** *Difference in pressure between the ends should not be more than 5 oz. A larger difference will cause the envelope to skew.*



## PHOTOSENSOR

**REQUIREMENT:** To ensure accurate timing with the duplicator, the correct sensing distance of photosensor must be maintained.

### **ADJUSTMENT:**

1. Plug feeder in to an electrical outlet.
2. Turn the feeder ON and set switch to **AUTOMATIC MODE**.
3. Place white No. 10 envelope [1] over photosensor [2] on front feed plate [3].
4. Using duplicator's suction feet [4], slowly lift the envelope. When the envelope is lifted 5/16" ( $\pm 1/16"$ ) over front feed plate [3], photosensor should activate the clutch solenoid (a "click" should be heard). If the solenoid does not energize of the distance differs from 5/16" ( $\pm 1/16"$ ), adjustment on P.C. board [5] must be made.

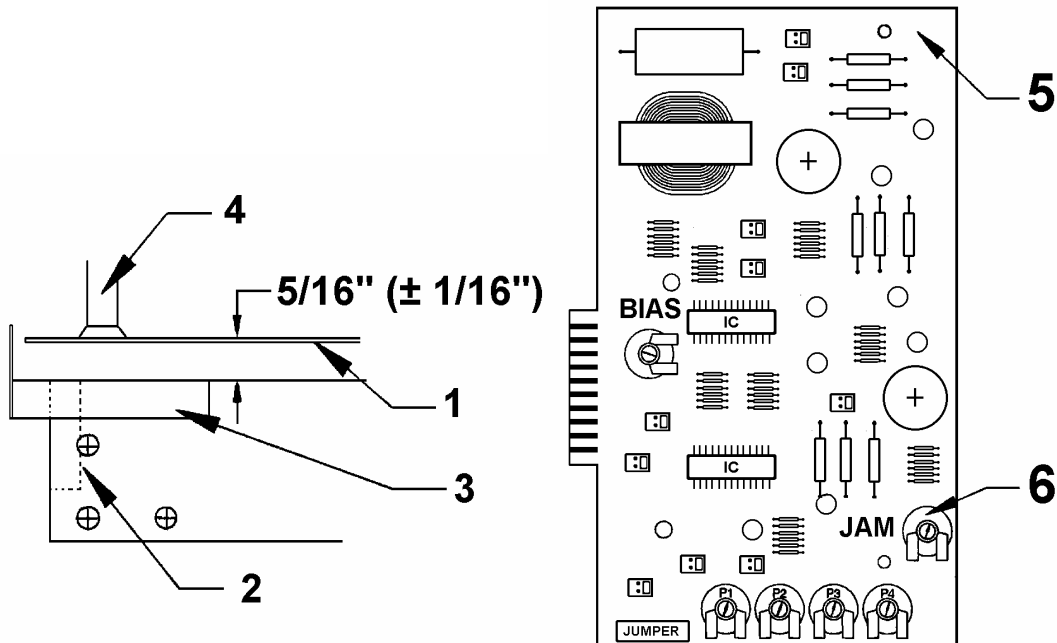
**NOTE:** *Make sure there are no foreign objects between the sensor and the envelope.*

5. Using the duplicator vacuum, raise the envelope 5/16" ( $\pm 1/16"$ ) above the surface of front feed plate [3].

6. Using a small screwdriver turn the **JAM** trimming potentiometer [1] COUNTERCLOCKWISE until it stops. SLOWLY turn **JAM** potentiometer CLOCKWISE until the sensor activates the solenoid (a "click" or series of "clicks" is heard).

**NOTE:** *The trimming potentiometer [6] for adjusting the photosensor is marked **JAM** or R39 and is located on the right rear corner of the P.C. board [5]. The adjusting screw is secured with a drop of lacquer. The lacquer should be scraped off prior to the adjustment.*

7. Check the adjustment and repeat steps 3 and 4.
8. When adjustment is completed, secure the **JAM** potentiometer [1] with a drop of hardening lacquer such as fingernail polish.



## **PHOTOSENSOR – DUAL STREAM**

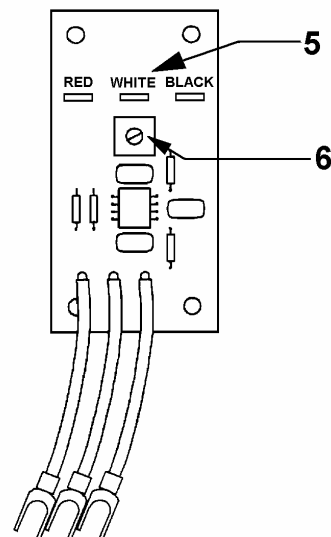
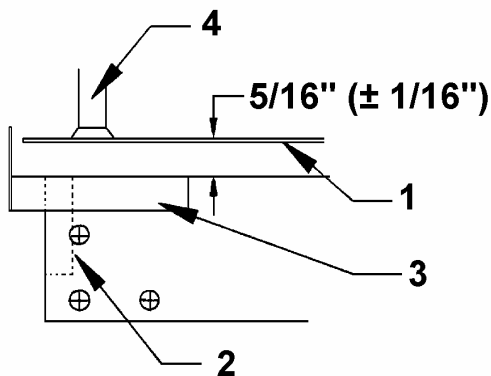
**REQUIREMENT:** To ensure accurate timing with the duplicator, proper sensing distance of photosensor must be maintained.

**NOTE:** *The standard photosensor must be adjusted before attempting to adjust the dual stream sensor. The only sensor covered in step 3 is the dual stream sensor.*

### **ADJUSTMENT:**

1. Plug feeder into an electrical outlet.
2. Turn feeder ON and set switch to AUTOMATIC MODE.
3. Place a white #10 envelope [1] over the DUAL STREAM PHOTOSENSOR [2] on front feed plate [3].
4. Using the duplicators suction feet [4], slowly lift the envelope up. When the envelope is 5/16" ( $\pm 1/16$ ") over the front feed plate [3], the photosensor should activate the clutch solenoid and a "click" should be heard. If the solenoid does not energize or the distance differs from 5/16" ( $\pm 1/16$ ") adjustment on the P.C. board [5] must be made.
5. Using the duplicator's vacuum, raise the envelope 5/16" ( $\pm 1/16$ ") above the surface of the front feed plate [3].
6. Using a small screwdriver, turn the trimming potentiometer [6] CLOCKWISE until it stops.
7. SLOWLY turn the potentiometer COUNTERCLOCKWISE until the sensor activates the solenoid (a "click" or series of "clicks" is heard).
8. Recheck adjustment steps 3 and 4.
9. When the adjustment is completed, secure potentiometer [6] with a drop of hardening lacquer such as finger nail polish.

**NOTE:** *The trimming potentiometer [6] for adjusting the photosensor is located in the center of the P.C. board [5]. The adjusting screw is secured with a drop of lacquer. The lacquer should be scrapped off prior to the adjustment.*



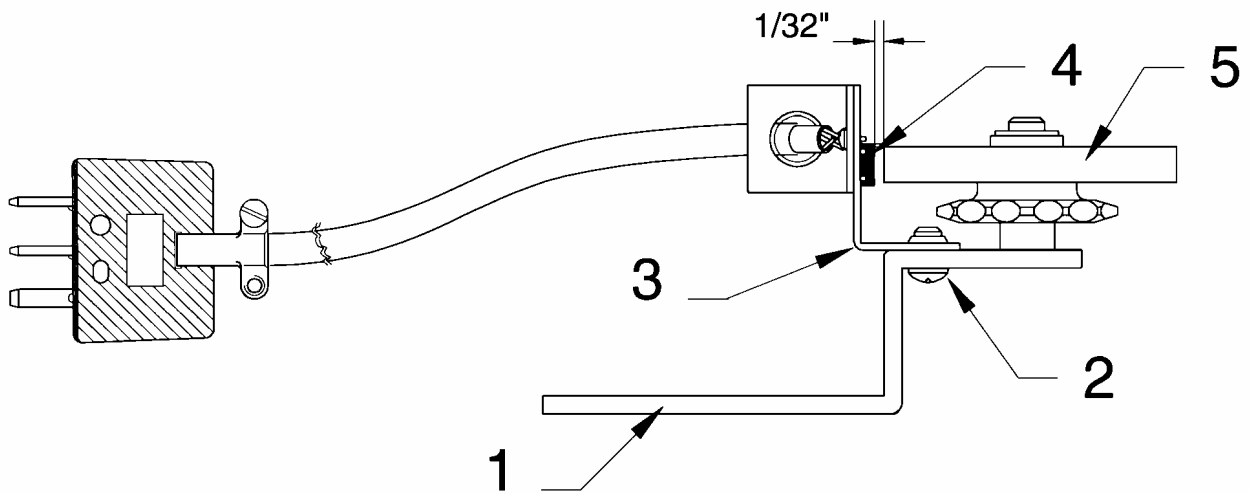
## **PULSE GENERATOR**

**REQUIREMENT:** The gap between the Hall Effect switch and the ring magnet must be  $1/32'' (\pm 0.010'')$ .

**NOTE:** While the Pulse Generator unit differs in design from one model duplicator to another, the adjustment method and dimensions are the same for all units.

### **ADJUSTMENT:**

1. Remove pulse generator [1] from the duplicator.
2. Loosen the two screws [2] and adjust bracket [3] so that gap between Hall Effect switch [4] and ring magnet [5] is  $1/32'' (\pm 0.010'')$ . Use 0.030" feeler gage to measure gap.
3. Tighten screws [2].
4. Reinstall the pulse generator making sure the gears mesh or that proper chain tension is maintained with only slight play depending on the duplicator the pulse generator is mounted on.

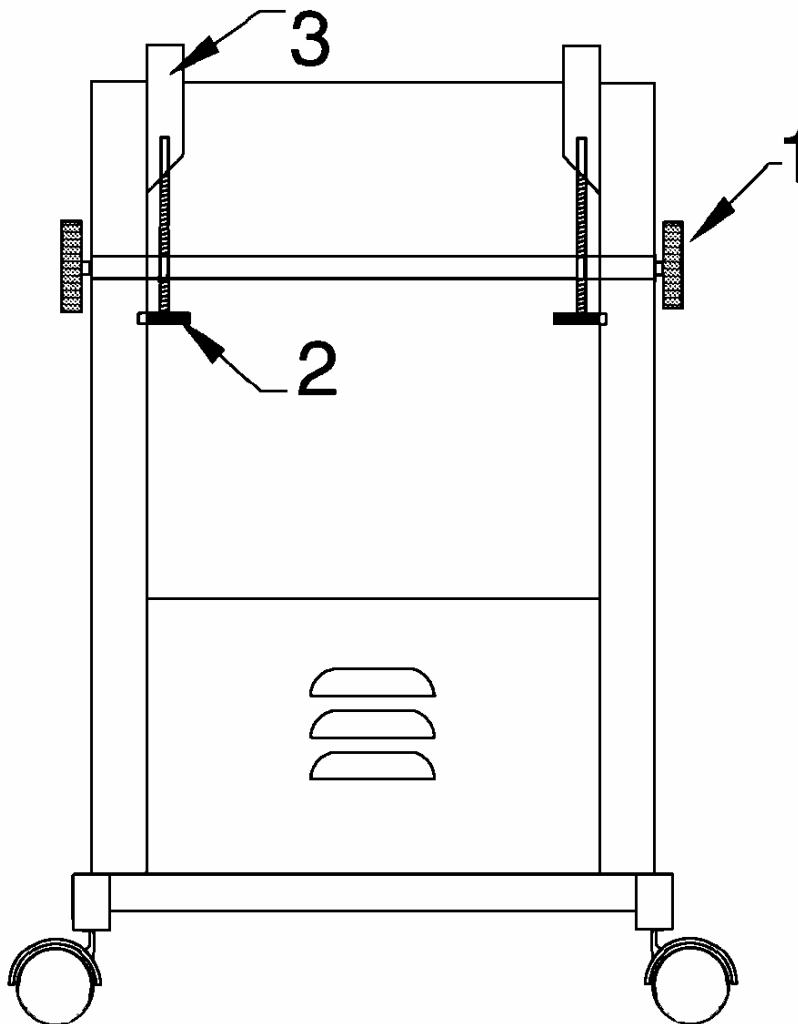


## **MODEL 2000 STAND – CLOSED PUMP STYLE**

**REQUIREMENT:** The feeder stop plate hook should be level ( $\pm 3/8$ " with the upper edge of the duplicator's front apron).

### **ADJUSTMENT:**

1. Roll feeder to duplicator and measure difference in height between feeder front plate and upper edge of duplicator's front apron.
2. Loosen locking knob [1] and lift or lower feeder to its desired height.
3. Tighten both locking knobs.
4. Move feeder back into position without hooking to the duplicator.
5. Turn the feed ON at duplicator and turn hand wheel to lower duplicator suction cups to feed table.
6. Suction cups must make contact with feed table uniformly.
7. Bring both inside leveler knobs [2] into contact with feeder mounting bracket [3].
8. Loosen locking knob on the low side of the stand.
9. Adjust that side with leveler knob [2].
10. Tighten locking knob.

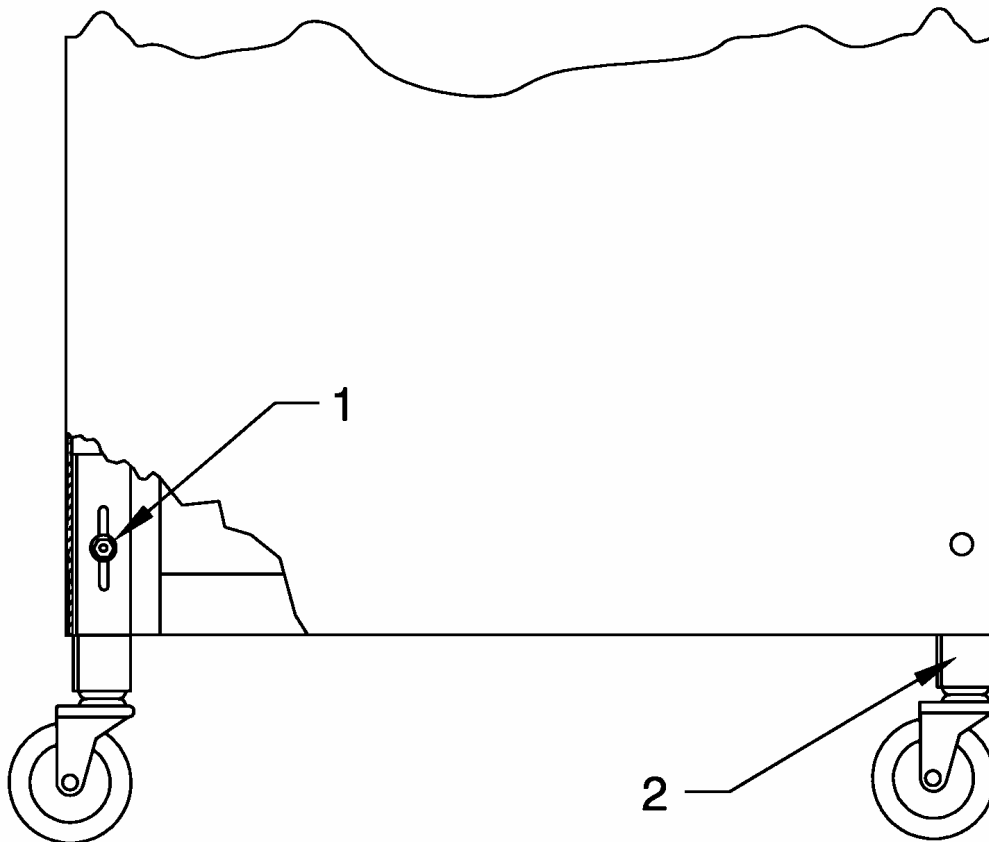


## **MODEL 1200 STAND – CABINET STYLE**

**REQUIREMENT:** The feeder front stop plate hook should be level ( $\pm 3/8$ "") with the upper edge of the duplicator front apron.

### **ADJUSTMENT:**

1. Roll feeder to the duplicator and measure difference in height between feeder front plate hook and upper edge of the duplicator front apron.
2. Place the feeder/stand assembly on its side and loosen the four nuts [1] securing stand legs [2].
3. Adjust all four legs as much as the measured difference between height of the feeder and the duplicator.
4. Tighten all four nuts [1] and return feeder/stand assembly to its upright position.
5. Recheck height of the feeder.

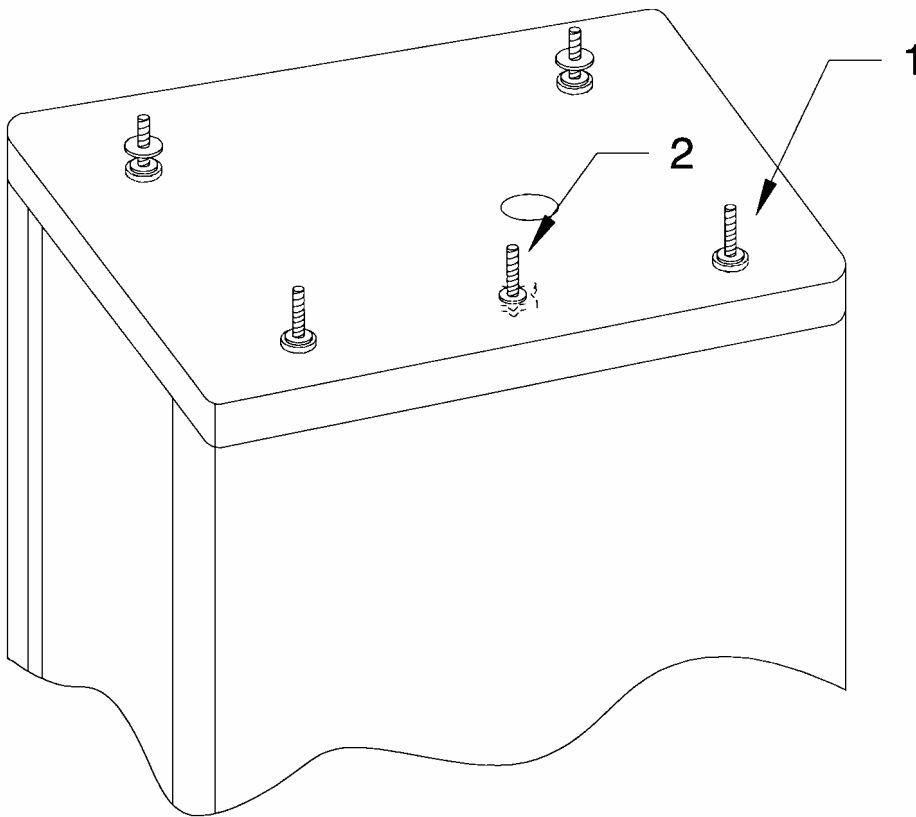


## **FEEDER LEVELING – CABINET STYLE**

**REQUIREMENT:** The feeder front feed plate must be level and parallel to upper edge of the duplicator's front apron.

### **ADJUSTMENT:**

1. Roll feeder to the duplicator. DO NOT hook it up at this time.
2. Loosen the two thumbscrews [1] and level the feeder by turning leveling knob [2].
3. After adjustment is made, tighten the two thumbscrews [1].
4. To check leveling, turn duplicator feed ON, turn handwheel until suction cups lower, and contact feed plate on conveyor. All suction cups must make uniform contact with the feed plate.

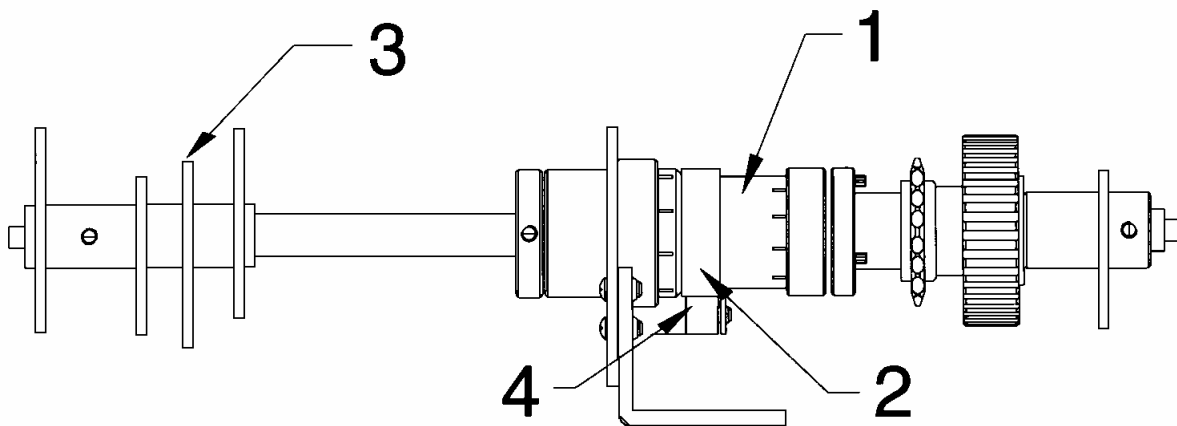


## **CLUTCH ASSEMBLY TIMING**

**NOTE:** The clutch assembly is factory pre-adjusted and should not require any field repositioning.

### **ADJUSTMENT:**

1. Remove pull out roller arm covers (4 thumbscrews). See Page 27.
2. Remove the top platform (4 Philips truss screws).
3. Remove spline collar retaining ring [1] from clutch case. Slide clutch stop until it is free of the spline collar [2].
4. Rotate camshaft until vacuum assembly cam follower is centered on *high point* of vacuum cam [3].
5. While maintaining proper cam position, slide clutch stop back on spline collar so that stop engages solenoid paw [4].
6. Manually release pawl from clutch stop then rotate cam shaft one complete revolution. Check that clutch disengages when vacuum assembly is on *high point* of cam.
7. Slide spline collar to its proper position on clutch case and reinstall items removed in steps 1 and 2.

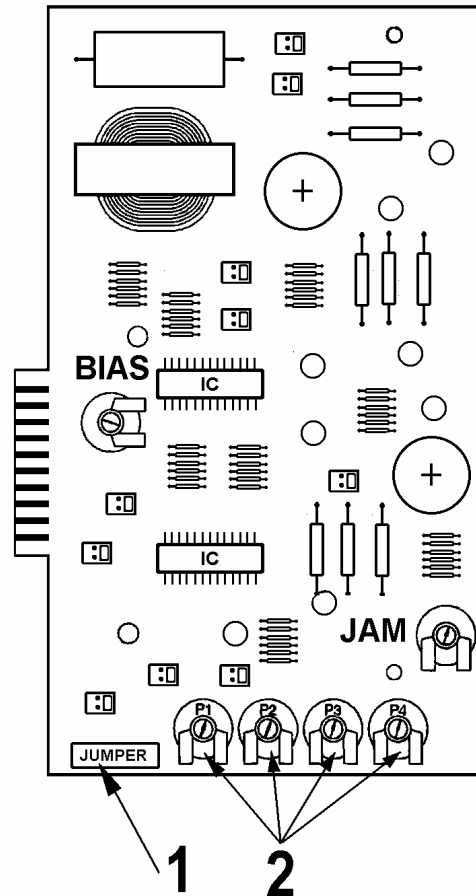


## **SPEED CONTROL**

**REQUIREMENT:** To ensure proper spacing between envelopes in the automatic mode, the pulse generator must control the speed of the envelope feeder.

### **ADJUSTMENT:**

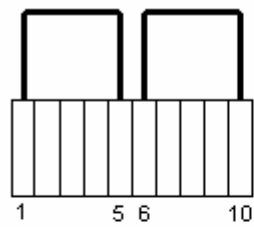
1. Set the duplicator to 6,000 impressions per hour setting.
2. Set the feeder to the manual mode and connect the cable from the Pulse Generator to the feeder.
3. Turn both feeder and duplicator ON and set the envelope feeder in the **MANUAL** mode.
4. Press the **SET-UP** switch and bring an envelope down into place on the feeder. Start the press feeding and adjust the manual speed control on the envelope feeder so that there is an envelope waiting each time the press is ready to feed an envelope. When the press and the feeder are feeding envelopes with approximately 3 inches space between #10 envelopes, stop the press and the feeder.
5. Remove the top platform from the envelope feeder and remove the cover from the control box.
6. Turn the envelope feeder ON and measure the voltage at the main terminal block between pins 1 and 2 where the main drive motor is connected. Make a note of the voltage reading.
7. Install the proper jumper plug [1] on the P.C. board. (Refer to the chart on the next page.)
8. Without changing and settings on the press or the envelope feeder, place the envelope feeder in the **AUTO** mode and start the press. Measure the voltage at the terminal block between pins 1 and 2.
9. Adjust the appropriate potentiometer [2] per the chart on the next page until the same voltage obtained in manual is obtained in the **AUTO** mode.
10. Secure the potentiometer with hardening lacquer such as nail polish.
11. Feed some 10" X 13" envelopes to see if the speed is correct. If the envelopes overlap, decrease the motor speed slightly.



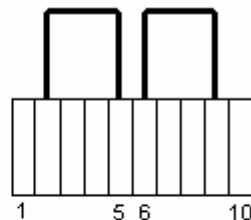
**SPEED CONTROL CONTINUED**

**JUMPER AND TRIMPOT SETTINGS**

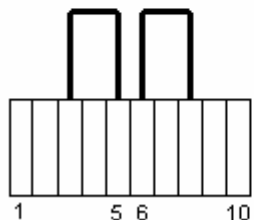
<b>DUPLICATOR</b>	<b>TRIMPOT</b>	<b>JUMPER</b>
AB DICK DUPLICATORS	P1	1
AB DICK 9985	P1	1
AB DICK 9920	P4	4
GESTETNER/CHIEF	P2	2
HAMADA 500/600/660/665	P4	4
HAMADA 601/602	P3	3
HAMADA 611/612	P3	3
HAMADA E47	P3	3
HAMADA 234	P2	2
HAMADA RS34/VS34	P3	3
HEIDELBERG TOK	P3	3
HEIDELBERG QUICKMASTER	NONE	NONE
HEIDELBERG PRINTMASTER	NONE	NONE
IMPERIAL	P2	2
ITEK 960/975/985	P2	2
ITEK 3985 (2 COLOR)	P1	1
MULTI 1218/TOKO 4700	P2	2
MULTI 1250/1300/1650	P4	4
RYOBI 2700/2800/3200	P2	2
RYOBI 3302 (2 COLOR)	P1	1



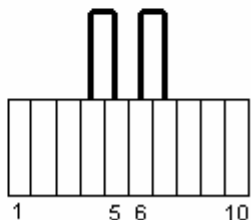
**JUMPER 1**



**JUMPER 2**



**JUMPER 3**



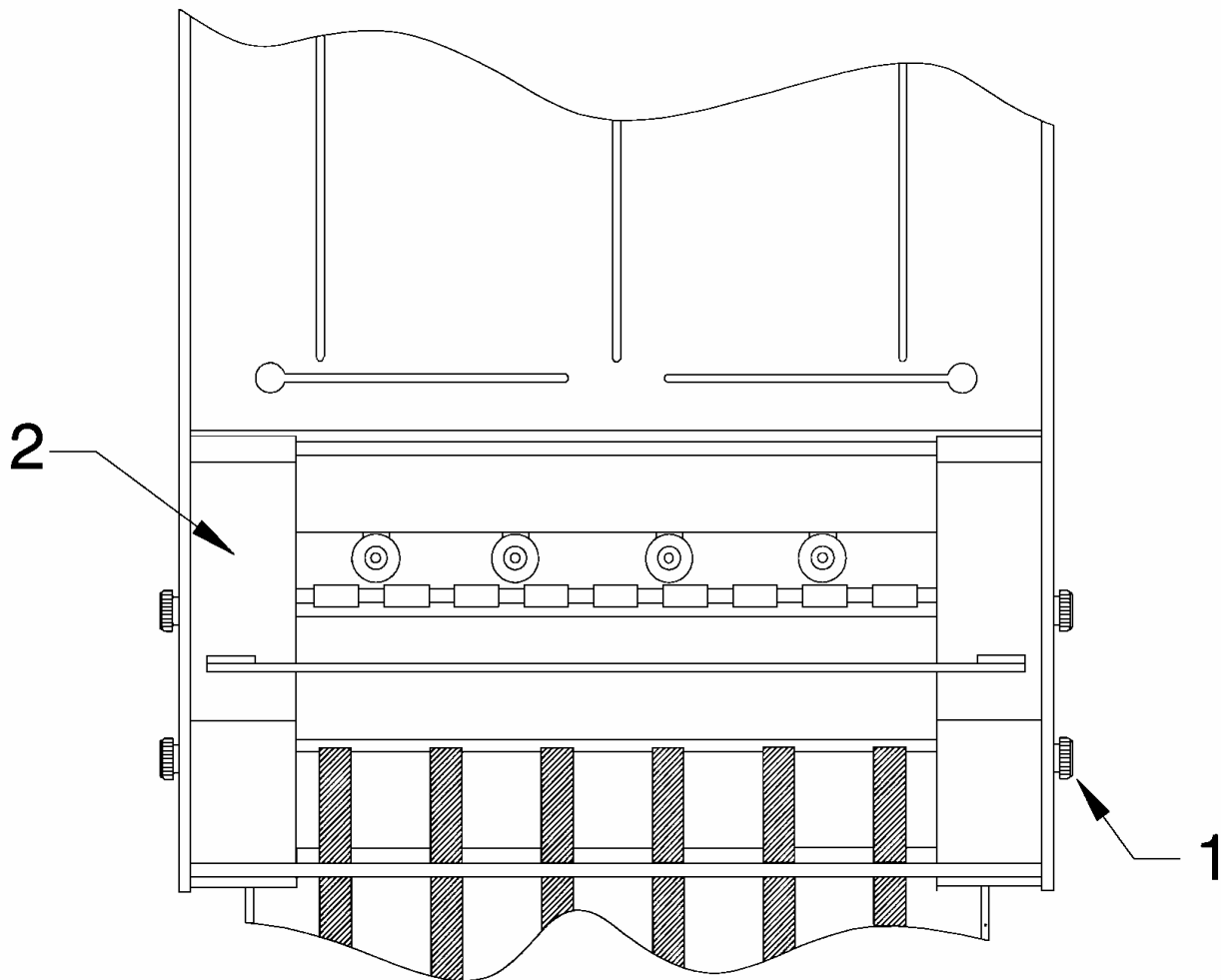
**JUMPER 4**



## Section 3 – DISASSEMBLY/ASSEMBLY

### REMOVING THE FRONT COVER ASSEMBLY

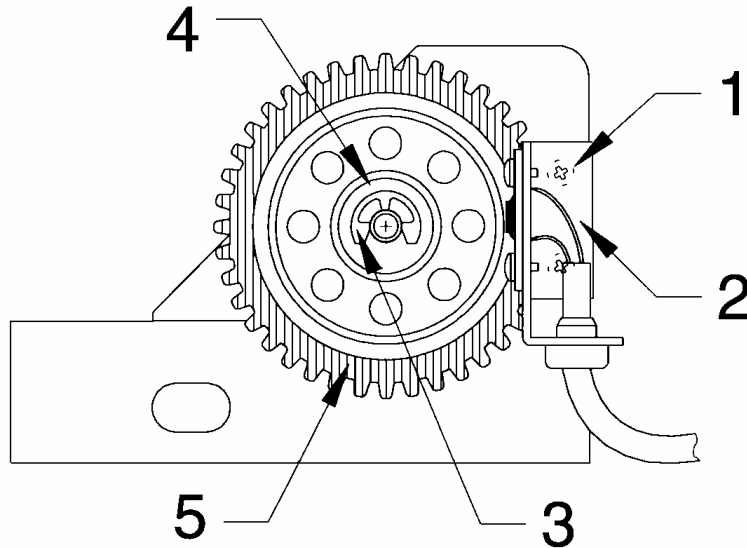
1. Switch the power to ON.
2. Set the **MODE** switch to **MANUAL**.
3. Turn speed control knob **CLOCKWISE** so that conveyor tapes move slowly.
4. Depress **SETUP** switch to begin cycle.
5. Wait until upper pull-out roller touches lower pull-out roller and switch power to OFF.
6. Unplug the feeder.
7. Unscrew the 4 thumbscrews [1] (2 on each side of the feeder).
8. Remove front cover assembly [2].
9. To reinstall the front cover assembly, repeat steps 1 through 6 and reverse steps 7 and 8 of removal.



## **DISASSEMBLING THE PULSE GENERATOR**

1. Remove the two screws [1] securing circuit board bracket assembly [2].
2. Remove retaining ring [3] and washer [4].
3. Remove gear assembly [5].
4. To reassemble the pulse generator, reverse the order of disassembly.

**NOTE:** *Refer to the adjustment section to set proper gap between the hall effect switch and ring-magnet.*



## **REMOVING THE FRONT CONVEYOR ROLLER**

1. Remove all accessories from feeder conveyor.
2. Remove one ball bearing housing from conveyor side frame (either right or left).
3. Remove front conveyor roller.
4. To reinstall the front conveyor roller, reverse the order of removal.

**NOTE:** *Make sure all six conveyor tapes are put on the roller and in tape guides.*

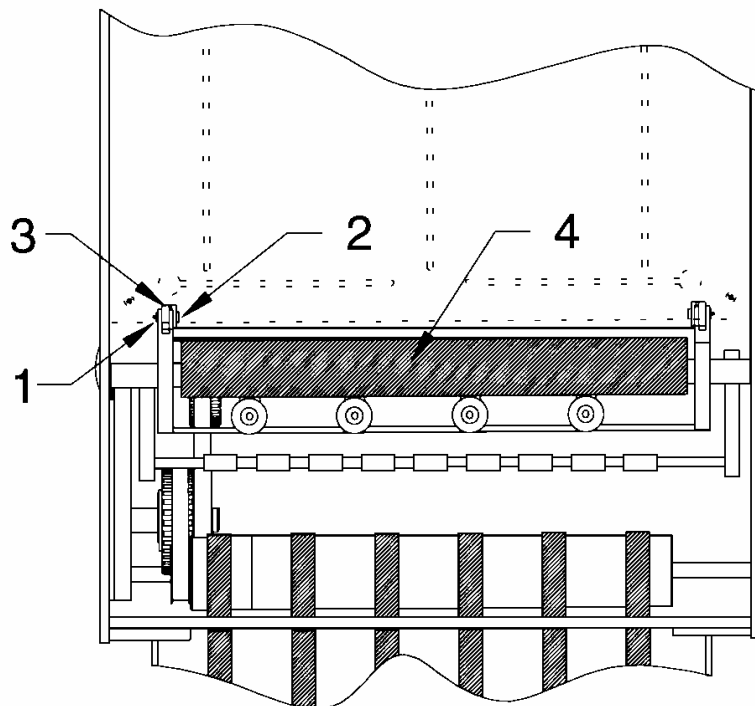
## **REMOVING THE REAR CONVEYOR ROLLER**

1. Remove front conveyor roller.
2. Remove the two ball bearing housing from feeder side frames.
3. Remove timing belts from the roller.
4. Remove rear conveyor roller from the feeder.
5. To reinstall the rear conveyor roller, reverse the order of removal.

**NOTE:** Refer to removal instructions on page 28.

**NOTE:** Make sure all belts and tapes are on the roller and in tape guides before installing it.

## **REMOVING THE LOWER PULL-OUT ROLLER**

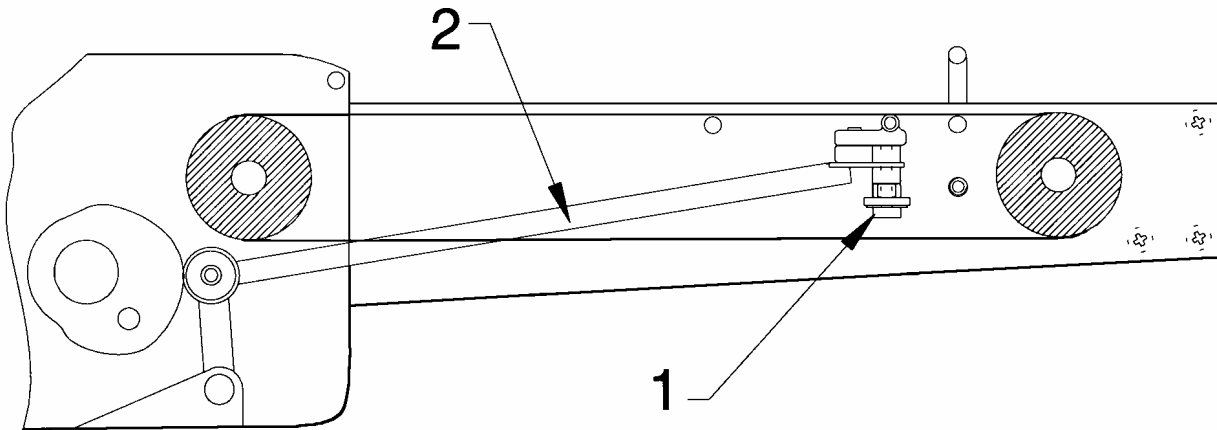


1. Remove front cover assembly.
2. Return the clutch to the neutral position so that the pull-out rollers DO NOT touch each other.
3. Unscrew the 4 screws, which secure the platform and remove.
4. Remove the two retaining rings [1] and remove pins [2].
5. Free the two links [3] from the levers.
6. Remove the two ball bearing housings.
7. Free lower pull-out roller [4] from belt and remove.
8. To reinstall lower pull-out roller, reverse the order of removal.

**NOTE:** Refer to page 27 to remove the cover.

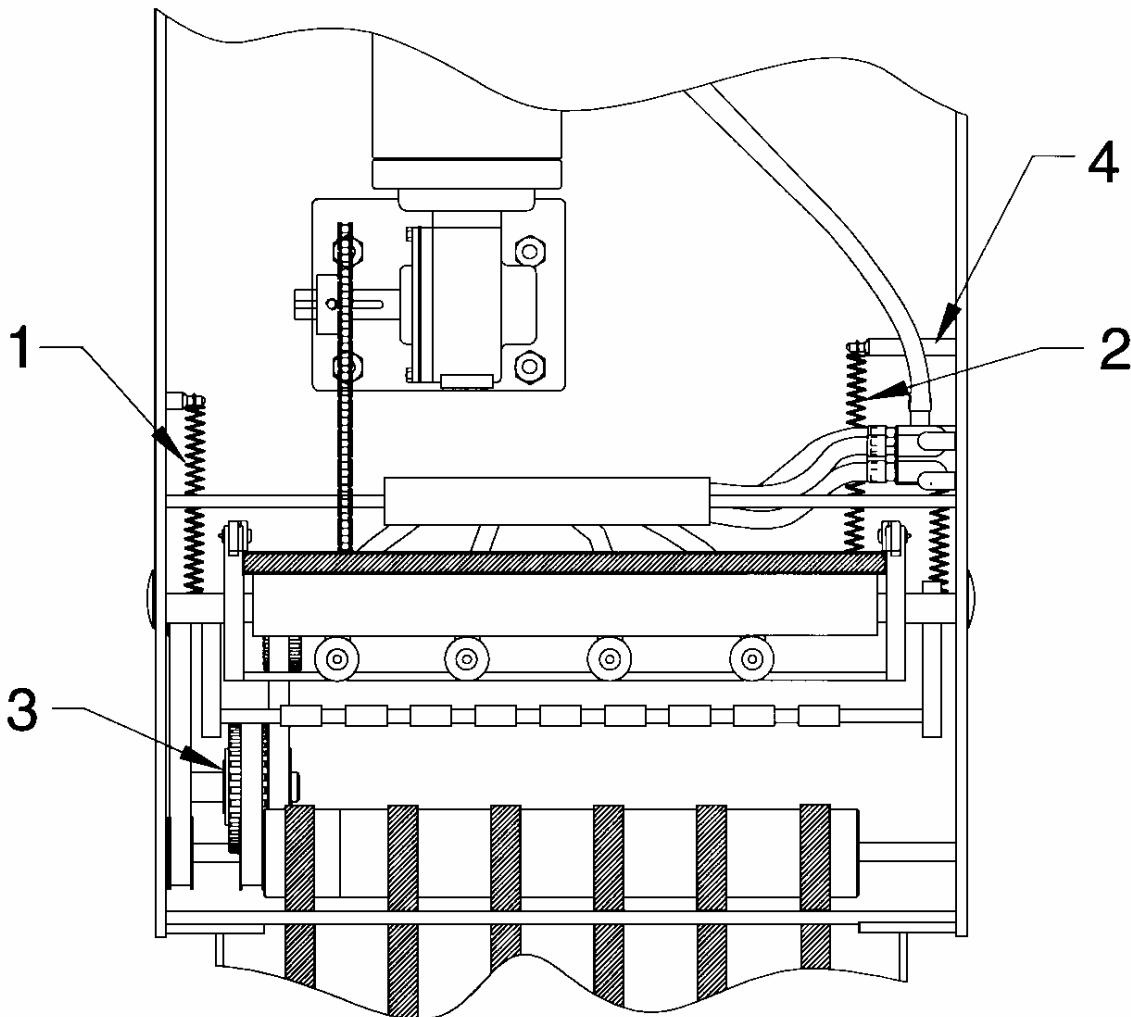
## **REMOVING THE CONVEYOR TAPES**

1. Remove all accessories from feeder conveyor.
2. Remove both front and rear conveyor rollers.  
**NOTE:** Refer to removal instructions on pages 28 and 29.
3. Remove retaining ring [1] and free jogger link [2].
4. Remove the 6 screws (3 each side) securing the conveyor to the feeder side frames.
5. Separate the conveyor from the feeder.  
**CAUTION:** DO NOT pull on photosensor cables.
6. Remove all 9 screws from the non-operator side of the conveyor.
7. Remove the non-operator side frame from conveyor.
8. Remove conveyor tapes.
9. To reinstall the conveyor tapes, reverse the order of removal.



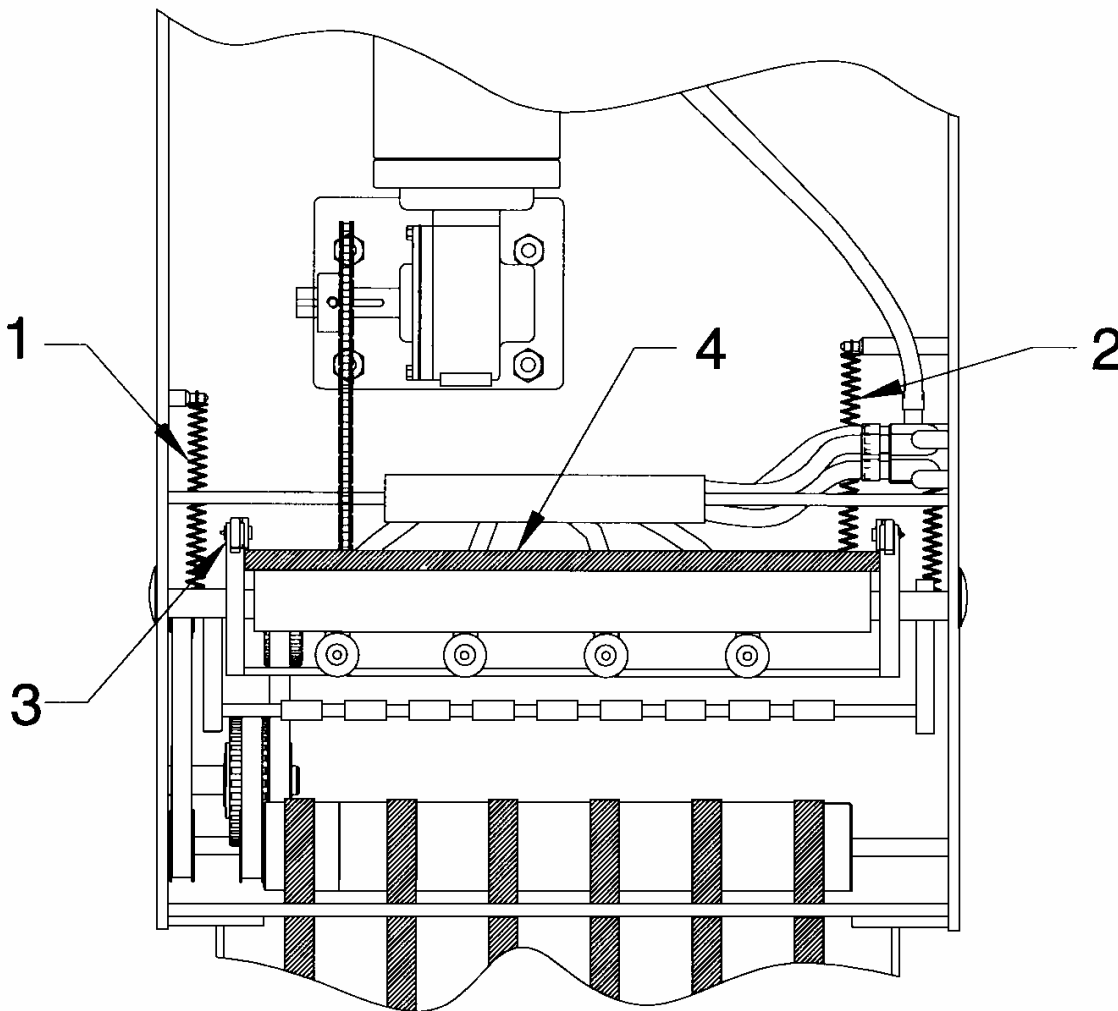
## **REMOVING THE CLUTCH ASSEMBLY**

1. Remove the feeder from stand and put on its side.
2. Remove the 2 screws securing the clutch bracket to the feeder motor base.
3. Return feeder to its upright position.
4. Remove front cover assembly.  
**NOTE:** Refer to page 27 to remove cover.
5. Remove top platform.
6. Remove back cover.
7. Remove spring from jogger rod.
8. Remove the two-pull-out roller springs [1] and carriage spring [2].
9. Remove combination pulley assembly [3] together with stud.
10. Remove spring stud [4].
11. Remove ball bearing housings.
12. Disconnect wires from clutch solenoid.
13. Move clutch assembly toward motor and remove chain from motor sprocket.
14. Remove clutch assembly.
15. To reinstall the clutch assembly, reverse the order of removal.



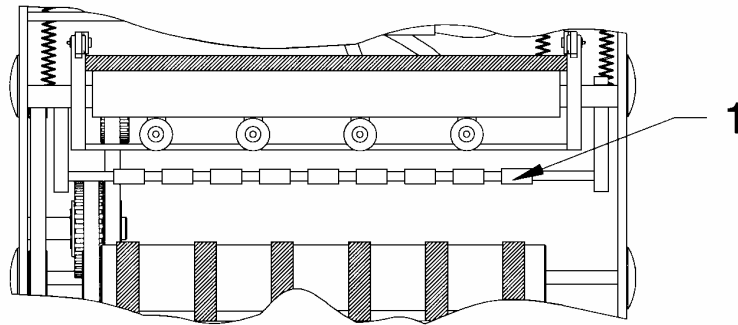
## **REMOVING THE OSCILLATING TUBE**

1. Remove front cover assembly.  
**NOTE:** Refer to page 27 to remove the front cover.
2. Remove top platform.
3. Remove two pull-out roller springs [1].
4. Remove oscillating tube spring [2].
5. Remove two link pins [3].
6. Remove the 2 screws (1 on each side) securing the oscillating tube shaft.
7. Loosen the 12 screws (6 on each side frame).
8. Spread the side frames and remove the oscillating tube [4].
9. To reinstall the oscillating tube, reverse the order of removal.



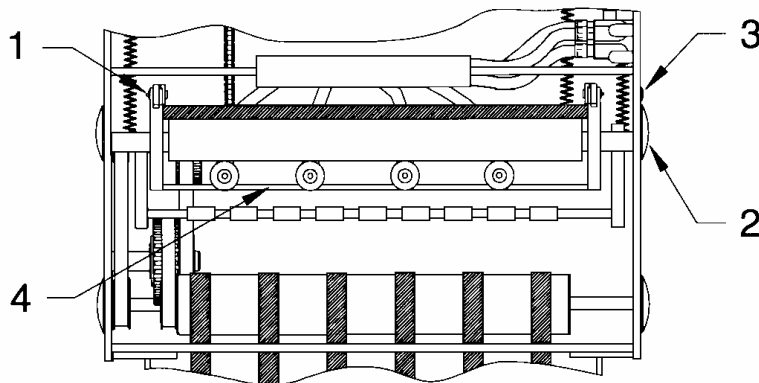
## **REMOVING THE UPPER PULL-OUT ROLLER**

1. Remove oscillating tube assembly.
  2. Remove upper pull-out roller [1].
- NOTE:** Refer to page 32 to remove the oscillating tube.
3. To reinstall upper pull-out roller, reverse the order of removal.



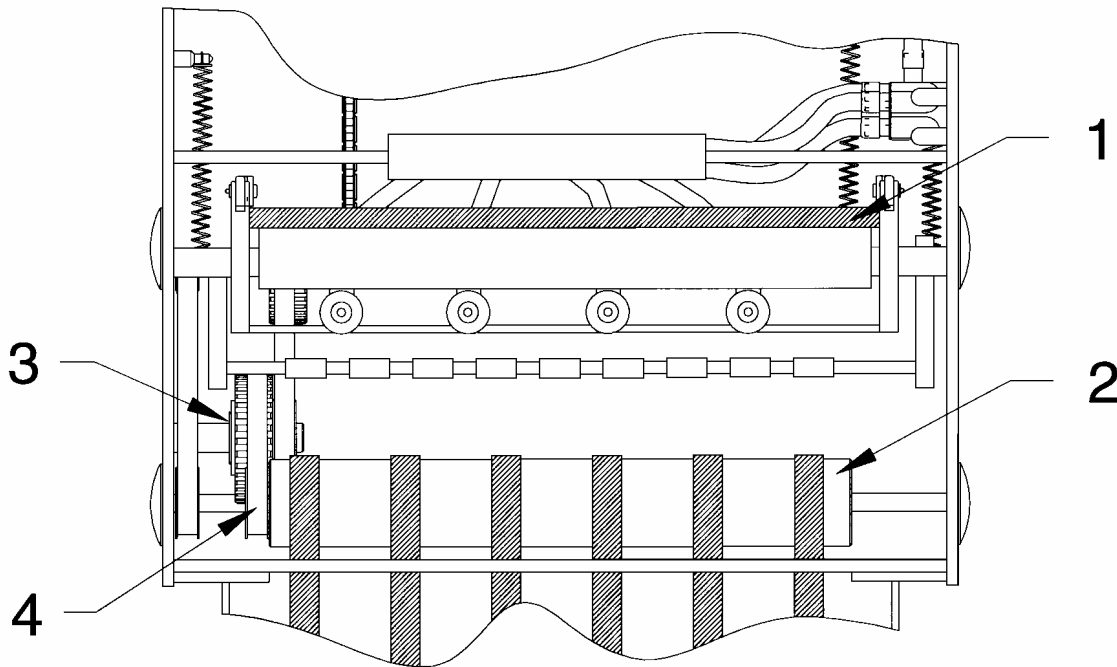
## **REMOVING THE SUCTION CUP CARRIAGE**

1. Remove front cover assembly.
2. Remove top platform.
3. Remove vacuum hoses from the 4 suction feet.
4. Remove the 2 link pins [1].
5. Remove the two bearing housings [2]. (2 On each side)
6. Remove the 4 screws [3] (2 on each side of the machine).
7. Remove suction cup carriage assembly from feeder [4].
8. To reinstall suction cup carriage, reverse the order of removal.



## **REMOVING THE IDLER ROLLER**

1. Refer to *Removing the Suction – Cup Carriage* to remove the carriage assembly.
2. Remove idler roller [1] from carriage assembly.
3. To reinstall the idler roller, reverse the order of removal.



## **THE CLUTCH TO COMBINATION PULLEY BELT EXCHANGE**

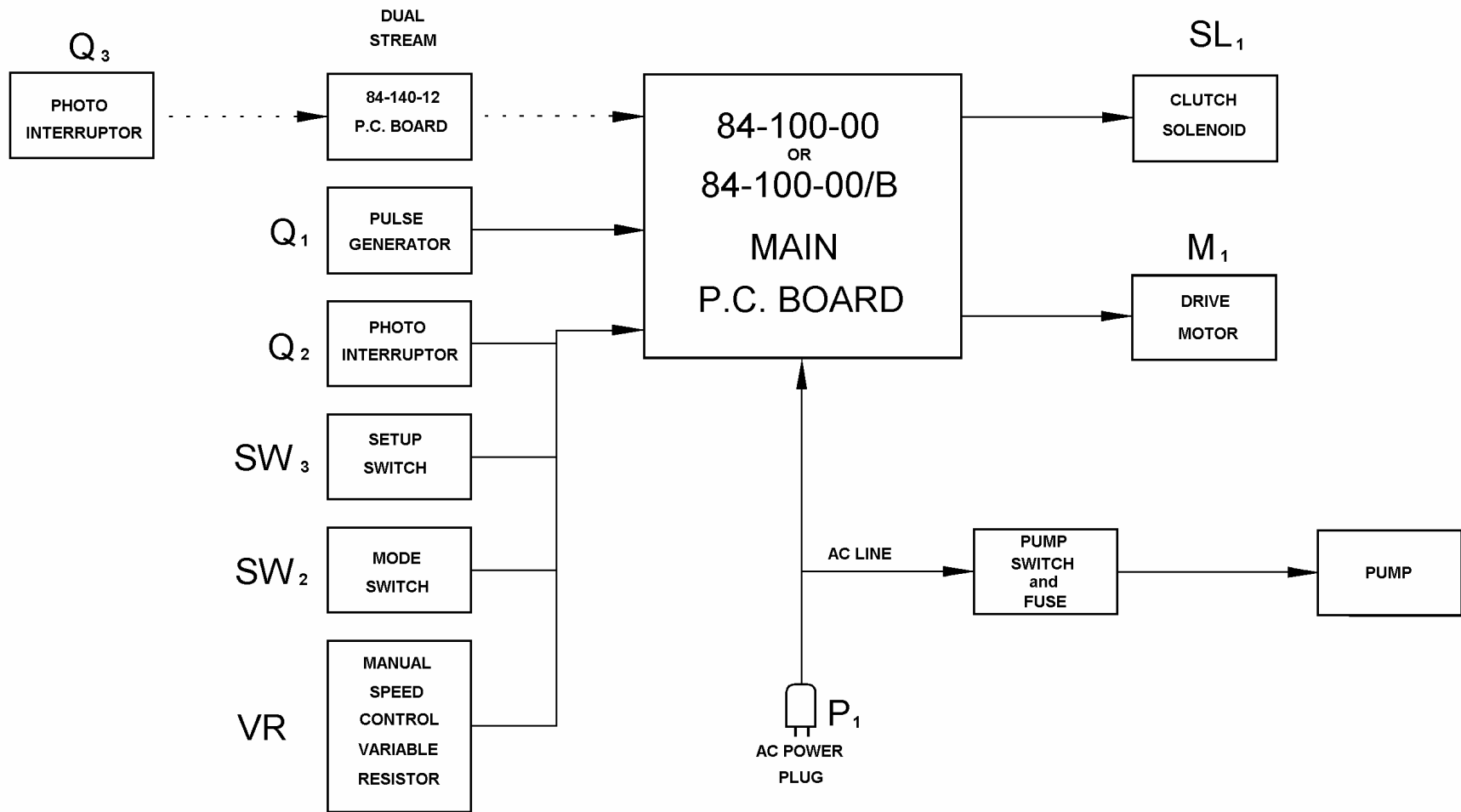
1. Remove rear conveyor roller [2].  
**NOTE:** Refer to page 29 to remove roller.
2. Remove stud with combination pulley [3].
3. Exchange the belt [4], reinstall the roller, and stud with pulley.

## **REAR CONVEYOR ROLLER TO THE LOWER PULL-OUT ROLLER BELT EXCHANGE**

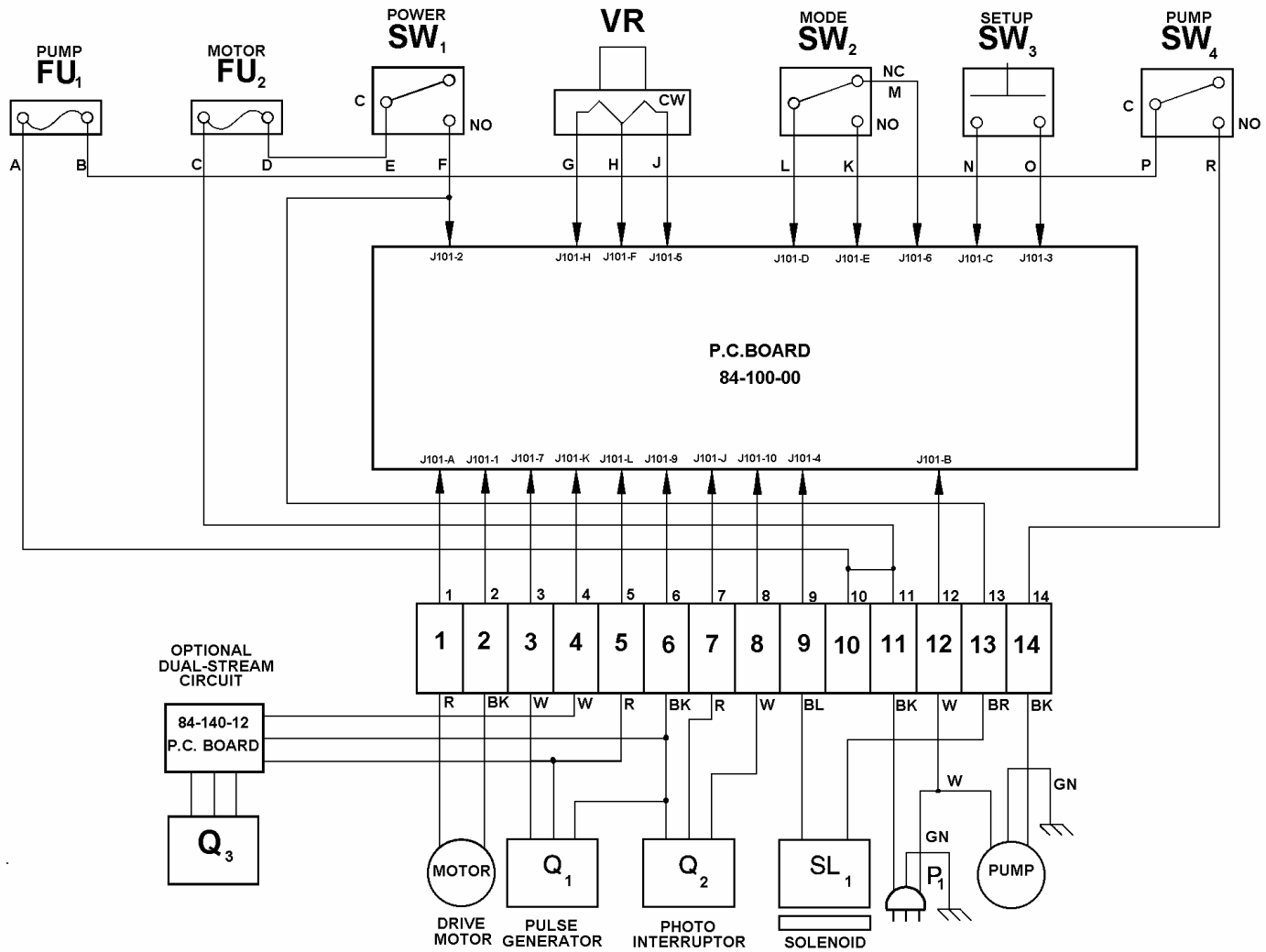
1. Remove the rear conveyor roller.  
**NOTE:** Refer to page 29 to remove roller.
2. Remove the lower pull-out roller.  
**NOTE:** Refer to page 29 to remove roller.
3. Exchange the belt and reinstall the rollers.

## **Section 4 – ELECTRICAL**

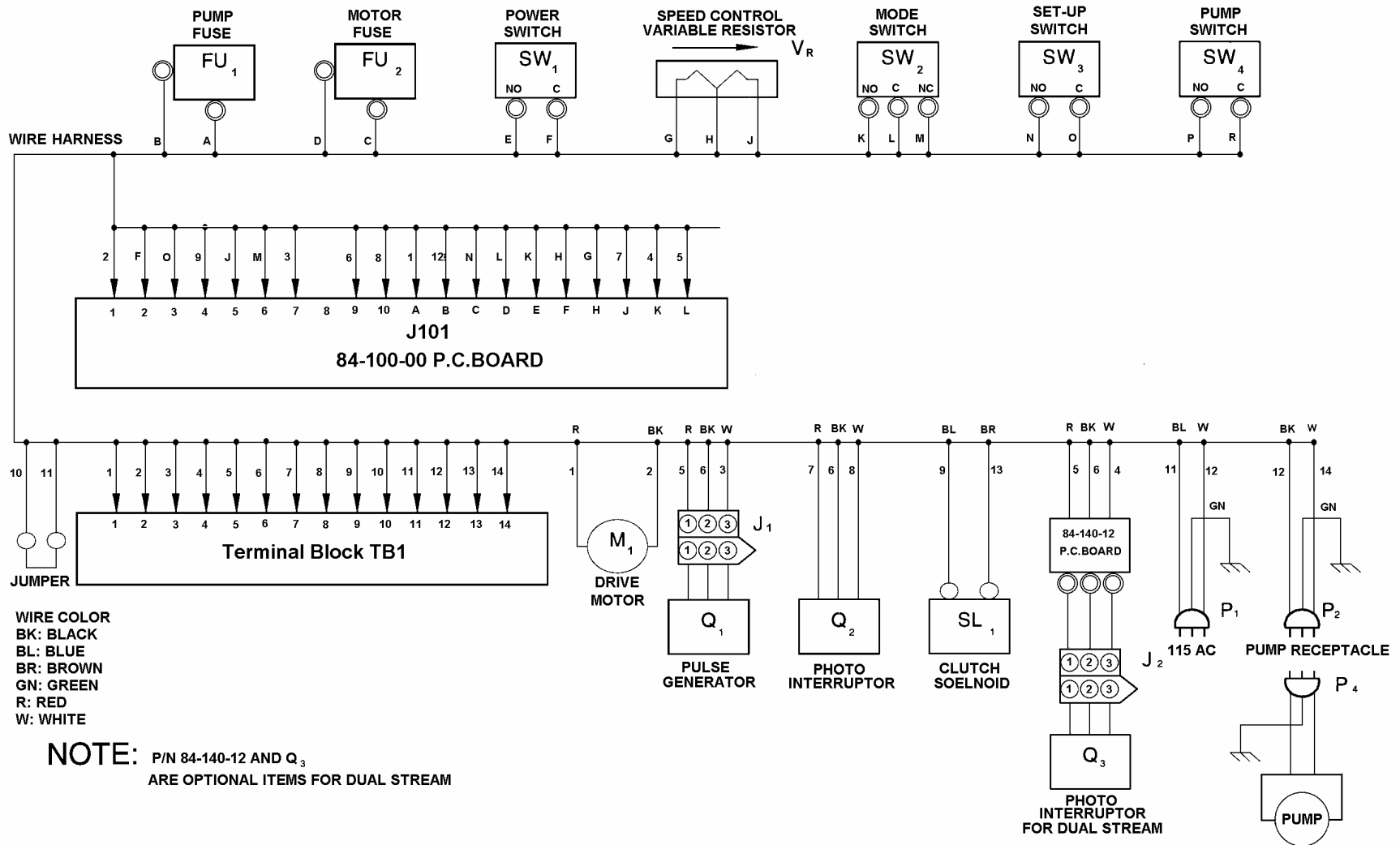
# ELECTRICAL FUNCTION DIAGRAM



# CIRCUIT DIAGRAM



# WIRING DIAGRAM



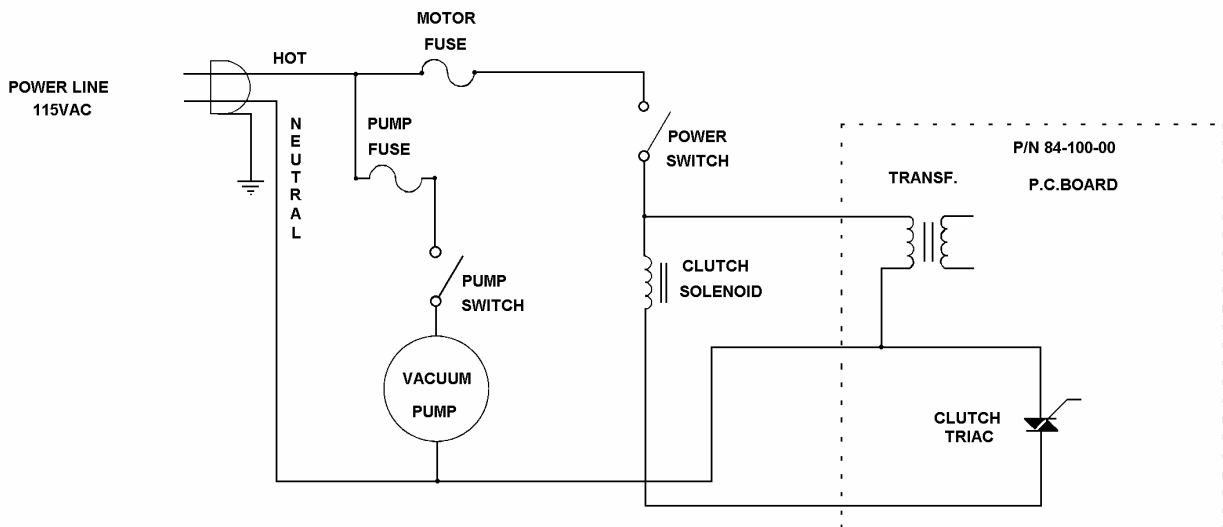
## A. C. CONTROL

### FUNCTION:

1. The pump switch completes the A. C. *hot circuit* to the pump allowing the pump motor to energize.
2. Depressing the POWER switch **ON** sets up the clutch solenoid with and A. C. HOT and powers transformer (T1) on the PC board.
  - ◆ +15 volts is applied to solenoid control circuitry.
  - ◆ VCC (a separate +15 volt supply) is applied to the motor control circuitry.

**NOTE:** If **MODE** switch is in closed (manual) position, the drive motor will energize. If **MODE** switch is open (auto), the drive motor will be in stand-by awaiting the pulse generator signal to tell the motor at what speed to drive the feeder.

### A. C. CONTROL SCHEMATIC



# CLUTCH SOLENOID CIRCUITRY

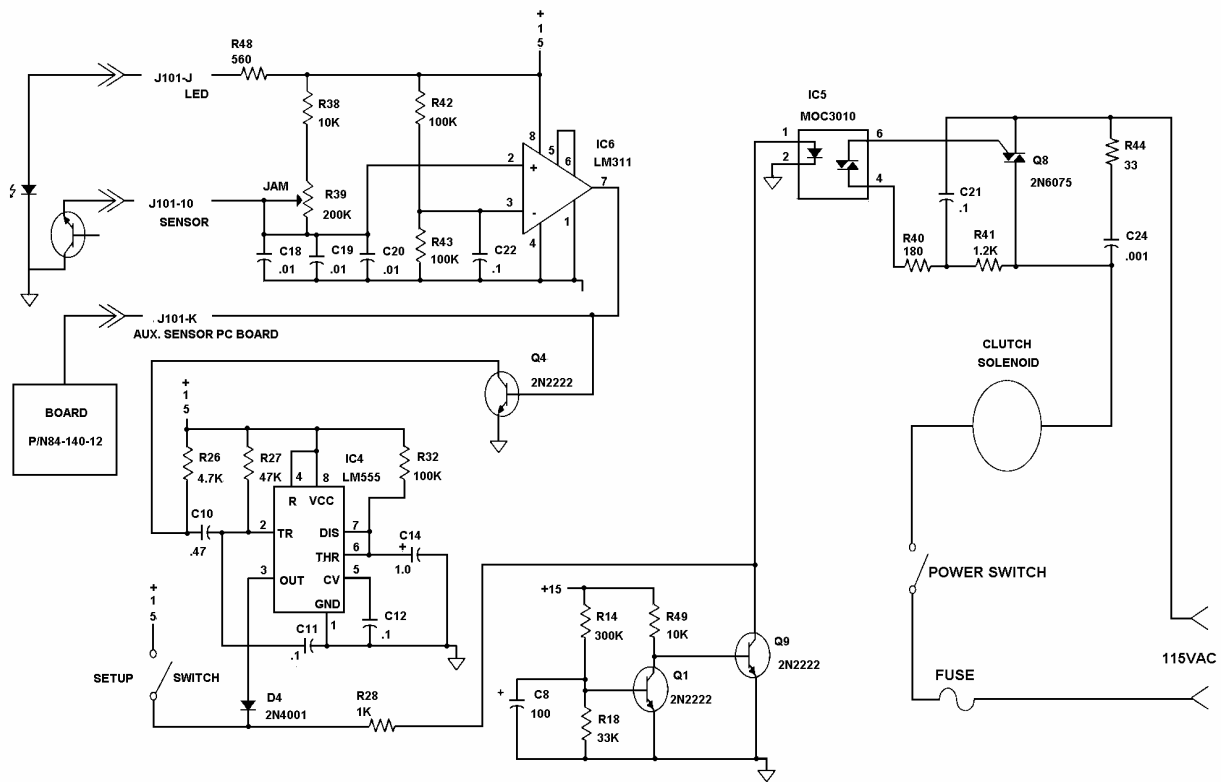
## FUNCTION:

The clutch solenoid is used to initiate an envelope feed cycle. When the conveyor LED/sensor shifts states (goes from light to dark), a signal is transmitted to the operational amplifier IC6 by connection J101-10. As the sensor passes through the 7 volt level a positive signal is transmitted to IC6-2. Once IC6 receives its signal a +4V output is passed from IC6 -7 to the base of Q4.

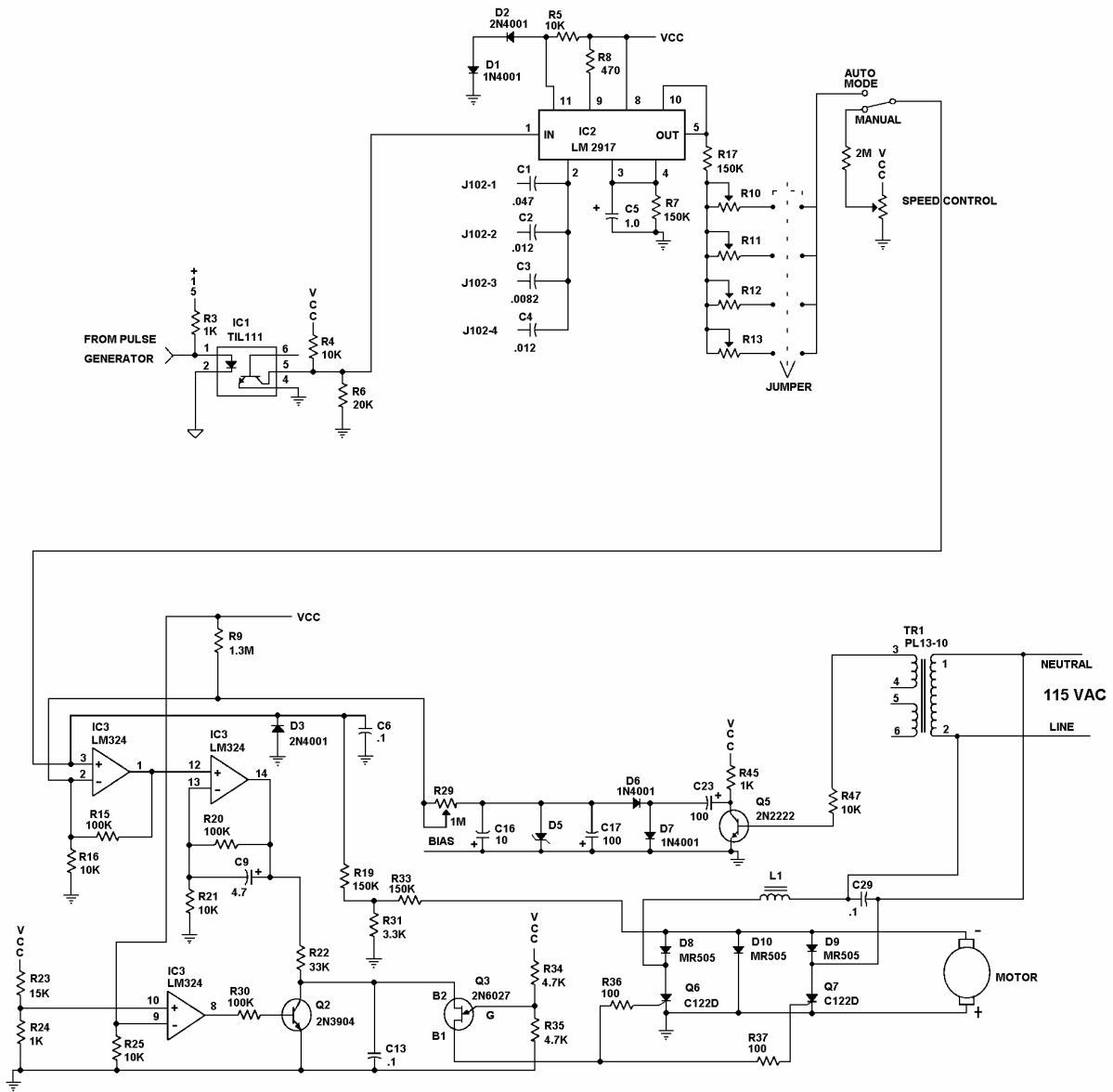
**NOTE:** *The dual stream feed kit contains identical circuitry to this point.*

Q4 is a trigger transistor for the 555 clock. When Q4 receives its base signal it is gated and provides pin 2 of IC4 (555) with logic LOW. The output of IC4 then switches to HIGH (+15V) powering up optical sensor IC5 which gates Q8 completing the common line to the solenoid.

## CLUTCH SOLENOID CIRCUIT SCHEMATIC



# UNREGULATED VCC



The above schematic is control circuitry for the drive motor.

Signal to the **MODE** switch is obtained from one of two sources.

1. The speed control potentiometer.
2. Pulse generator on the duplicator.

## **MANUAL SIGNAL**

15 Volts VCC is constantly applied to the speed control. When the MODE switch is placed in the MANUAL position, a portion of VCC is tapped from the speed control through the limiter R-1 to pin 3 of IC3. The voltage will increase as the variable resistor is turned. Once pin 3 voltage exceeds the value at pin 2, the operational amplifier will have an output signal. A second operational amp gate is used to buffer the signal to a Uni-junction transistor Q3. The ULT (Q3) is used to turn on and off the two SCR's. Q6 and Q7 which control the motor.

## **AUTO SIGNAL**

When the MODE switch is in the AUTOMATIC position, the drive motor sequence is the same as the previously described manual signal with the exception of the signal source. The duplicator, when running, is generating a drive signal by way of the pulse generator. The signal is sent to IC1, and optical isolator. IC1 provides the input to a frequency-to-voltage converter IC2. This device takes the voltage pulses from the pulse generator and converts them to a voltage level. The output voltage is passed through a potentiometer that is calibrated for the duplicator/feeder speed. From this point on the signal is identical to the manual circuit path and function.



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