

# **Rapid-Air Corporation Operating Instructions**

## **Straighteners / Rapid Roll** (rev. 1)

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## INDEX

1. Installation	Page 2
2. Electrical Control Layout	Page 3
3. Operating Instructions Straightener SB	Page 7
4. Operating Instructions Straightener SC	Page 9
5. Operating Instructions Rapid Roll	Page 12
6. Trouble Shooting	Page 14
7. Wiring Diagram	Page 16
8. Ram - Solid State Motor Control	Page 17

**Rapid-Air Corporation**  
**Operating Instructions**  
**STRAIGHTENERS / RAPID ROLL**  
**(rev. 1)**

**INSTALLATION**

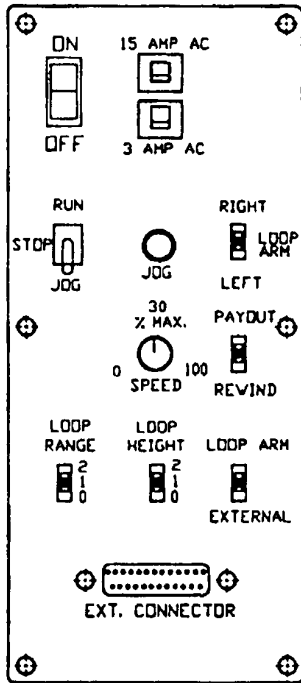
Align the Rapid Roll with the feed allowing sufficient space for free stock for the feed. The loop control arm roller rests on the stock between the Rapid Roll and the press. The Rapid Roll should be bolted to the floor, especially when used to pull stock from a non powered reel.

The pinch rolls must be parallel in the lateral (horizontal plane to insure that there will be equal pinch force along the full width of the stock). An upper pinch roll adjustable eccentric trunion is slotted with a locking screw in its center. Adjust parallelism of the rolls by loosening the center screw and rotating the trunion through 180 degrees. A wide blade screw driver and allen wrench may be used. Use a feeler gage to check for equal spacing on either side of the pinch rolls.

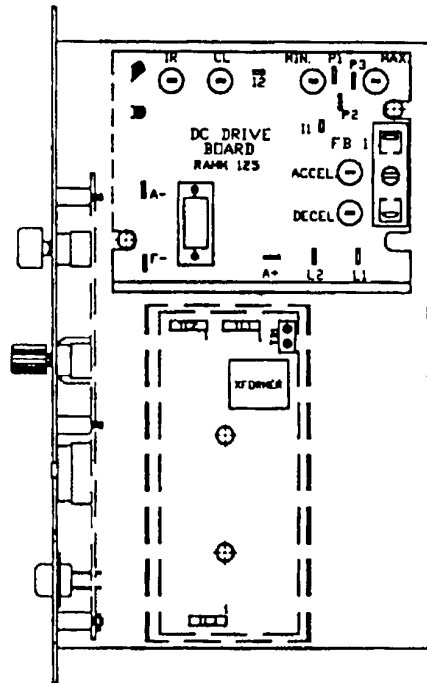
Perform a visual check by lifting the cover and placing a white piece of paper in front of the pinch rolls to reflect light through the space between. Tighten the pinch roll knob so the rolls just touch. Observe the slit of reflected light between the rolls and make any final adjustment. Tighten the trunion lock screw. Raise the pinch roll to allow clearance for the next set up procedure.

The main control unit is located behind the side access cover. Fig. Man 30 (see page 3) is an illustration of the layout of the control panel. This diagram lists all the components and the approximate location of each that could be used for troubleshooting the machine if a problem should occur. The reel is shipped with - 120 vac (1 phase) input. Visually check all electrics before starting the reel.

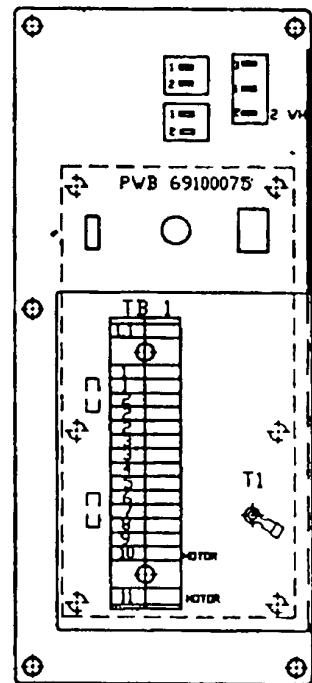
Fig Man 30



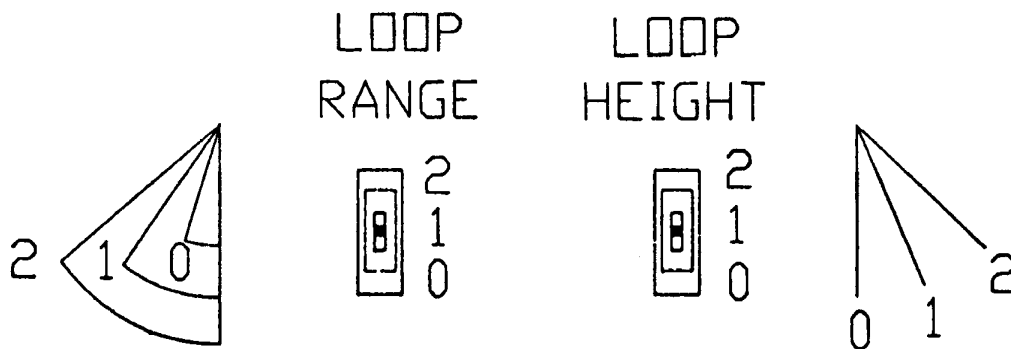
FRONT VIEW



SIDE VIEW



REAR VIEW



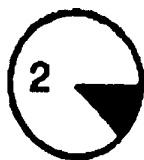
### DANCER ARM LOOP HEIGHT ADJUSTMENT

Three different loop sensing arm operating positions are selected manually during set-up. By selecting the higher number, the zero point of the dancer arm is raised from its rest position to the angle shown (as indicated 0-2). The dancer arm will move from rest position to the angle selected before the pallet reel begins to rotate.

### DANCER ARM LOOP RANGE FUNCTION



**30 degree** - Loop sensing arm travels through a full 30 degree arc to vary turntable rotation speed from slow to full speed as controlled by % speed pot.



**20 degree** - Loop sensing arm travels through a 20 degree arc to vary turntable speed from slow to full speed as controlled by % speed pot.



**10 degree** - Loop sensing arm travels through a 10 degree arc to vary turntable rotation speed from slow to full speed as controlled by % speed pot.

## **START UP PROCEDURE**

Prior to applying power to the machine the operator should review all the controls on the machine. A brief summary of the controls is listed below.

### **MAIN CONSOLE & CONTROLLER**

The main control console & controls are mounted on the end of the cabinet. Located on the face of the console are eight switches, one potentiometer, pushbutton and 2 reset switches, which are explained below.

**1. % SPEED POT** - The % speed pot adjust the maximum speed that the reel will rotate and should be set to maintain a constant feed rate.

**2. ON/OFF SWITCH** - This illuminated switch is the main power switch for the controller. It must be "ON" for the machine to function.

**3. RUN/STOP/JOG SELECTOR SWITCH** - The switch selects between Run & Jog. If in Run and the control arm is moved the coil plate will turn. If in Jog, the Jog button has to be depressed for the coil plate to turn.

**4. JOG BUTTON** - Used for intermittent movement of the coil plate, mainly for set up, speed is adjusted on the 69100076 board by potentiometer R3 on the electrical control sub panel.

### **5. DANCER ARM LOOP HEIGHT & RANGE ADJUSTMENT**

- a. Loop Range - The loop range switch adjusts the amount of travel the dancer arm will move to provide the full range of speed of the pallet reel.
- b. Loop Height - This switch is used for setting the start position of the control arm. The setting determines when the reel will start turning. Each position will move the operating angle of the arm so that top-to-bottom travel is adjusted to accommodate specific material and loop height requirements.

**6. LOOP ARM/EXTERNAL SWITCH** - This switch selects either dancer arm (internal) or "D" connector (external) speed control functions.

### **7. RESET BUTTONS**

- a. 15 amp - This is the main circuit breaker for the reel.
- b. 3 amp - This is the circuit protection for the "D" connector. Any shorts or over loads would trip this breaker.

**8. REMOTE INTERFACE PORT "D" CONNECTOR** - This connector is used to communicate with external loop control equipment.

**CAUTION: Never plug any type of computer or non Rapid-Air equipment into this plug or severe damage will result. Always consult with the factory when installing new external controls for compatibility and wiring information.**

ELECTRICAL COMPONENT DESCRIPTION

69100034 board - proportional control board

69100076 board - component interface board

PC control board - (RAMM) - D.C. motor board

## STRAIGHTENER SA3 - SB4

### OPERATION

For set up only, place a short length of stock about four feet on the bottom rolls, between the pinch rolls. Set the entrance guide rolls before lowering the cover. Make sure the top rolls are retracted to prevent stock deformation. Apply light pinch roll force on the stock to insure adequate assisting pulling force on the stock and to prevent slippage of the stock over the straightener rolls. Never overload the pinch rolls. This could damage the stock by extrusion causing permanent deformation.

With the cover down and the stock in place, position the idler rolls such that they are mid way between the drive rolls. The windows in the side of the cover are visual indicators of the idler rolls relative position to the drive rolls.

Do not lock the cover down at this time. With the cover held down firmly by hand, lower the vertical entrance knob until the first idler roll contacts the stock with only slight deformation (crease) at the station. Observe the degree of deformation at this first station by lifting the cover and noting the pattern of light reflecting off the stock surface. Rotate the vertical entrance knob 1/4 turn down and lock in place.

Close the cover, hand hold in place while lowering the exit knob. Continuously observe the changing deformation pattern until all but the last station reflects a change. The stock should reflect a diminishing deformation pattern until the final set of exit rolls afford no deformation. Lock the exit knob. Close the cover and latch.

The dancer arm position for height and range is operator selectable through the settings of thumbwheels. The speed of the straightener rollers is automatically controlled by the position of the dancer arm. As the dancer arm is raised the straightener rollers increase in speed. This minimizes starting and stopping and resultant stock deformation.

### CAUTION

Lateral adjustment, generally, requires no more than two or three turns either side of center. Never force idler rolls against the powered rolls. This will deform the stock.

### CAPACITY

The model SA# is designed for 3" maximum width and .005 to .020 thick material. The SB4 is designed for 4" maximum width and .007 to .035 thick material. The maximum feed rate for SA3 and SB4 is 700 inches per minute. The maximum feed rate for SAM3 and SBM4 is 1400 inches per minute.

### ELECTRIC MOTOR

SA3 and SB4 straighteners are furnished with a 1/4 HP - 2500 RPM permanent magnet motor. Input power is single phase, 115 volt A.C. rotation must be CW as viewed from shaft end. SAM3 and SBM4 have a 1/2 HP motor.

## LUBRICATION

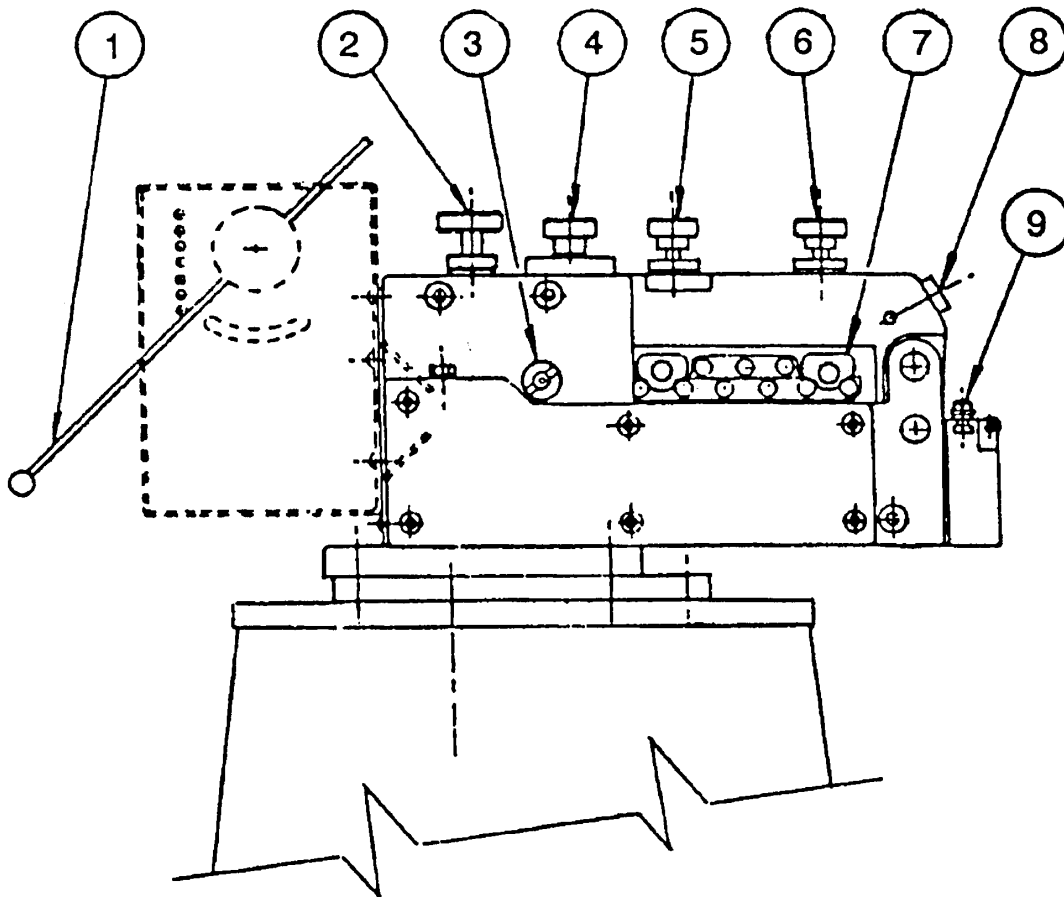
Gear transmission oil - use Mobil 2000 SSU 100 degree F 600W cyl. Oil or equivalent.

SA3 & SB4 Worm Gear Case (above motor) 4 oz. capacity

SA3 Spur Gear Case (stn'r side) 4 oz. Capacity

SB4 Spur Gear Case (stn'r side) 6 oz. capacity

Change oil every 1000 hours



1. Loop Control Arm
2. Pinch Roll Knob
3. Eccentric Trunion
4. Cover Latch
5. Exit Adjustment Knob
6. Entrance Adjustment Knob
7. Visual Indicator Window
8. Lateral Adjustment Knob
9. Entrance Guide Rolls

## SC SERIES POWERED STRAIGHTENERS

### OPERATION

For set up only, place a short length of stock about four feet on the bottom rolls, between the pinch rolls. Set the entrance guide rolls before lowering the cover. Make sure the top rolls are retracted to prevent stock deformation. Apply light pinch roll force on the stock to insure adequate assisting pulling force on the stock and to prevent slippage of the stock over the straightener rolls. Never overload the pinch rolls. This could damage the stock by extrusion causing permanent deformation.

Do not lock the cover down at this time. With the cover held down firmly by hand, turn the first adjustment screw until the idler roll contacts the stock with only slight deformation (crease) at that station. Observe the degree of deformation at this first station by lifting the cover and noting the pattern of light reflecting of the stock surface. Never overwork the stock between any set of rollers. Do not form beyond the point where an opposite set is just established.

Repeat this adjustment in succession with the next three upper (idler) rolls each with a decreasing degree of stock deformation until the last (forth) roll reflects no deformation. This last idler roll will be put into play as a final adjustment if needed. At this early set-up stage it should be used as a stabilizer to keep the stock in a flat plane between the last set of two driverolls and the one last idler. --Close the cover and latch. Run one or more short length set-up pieces while making final adjustments. Once the proper setting has been determined, the quick release top maintains the adjustment during reloading.

The dancer arm position for height and range is operator selectable through the setting of thumbwheels. The speed of the straightener rollers is automatically controlled by the position or the dancer arm. As the dancer arm is raised the straightener rollers increase in speed. The loop control arm and variable speed control dial should be adjusted so that the straightener speed slightly exceeds the feed rate required. This minimizes starting and stopping and resultant stock deformation.

Specifications				
Model	Max. Stock Width (In.)	Effective Straightening Range (In.)	Std. Speed Range (In./Min.)	Std. D.C. Motor (HP)
SC	4	.015-.085	0-825	1
SCM4	4	.015-.070	0-1650	1
SCH4	4	.015-.075	0-4125	3
SC8	8	.015-.071	0-825	1
SCM8	8	.015-.068	0-1650	2
SCH8	8	.015-.068	0-4125	3
SC12	12	.015-.050	0-825	1
SCM12	12	.015-.050	0-1650	2

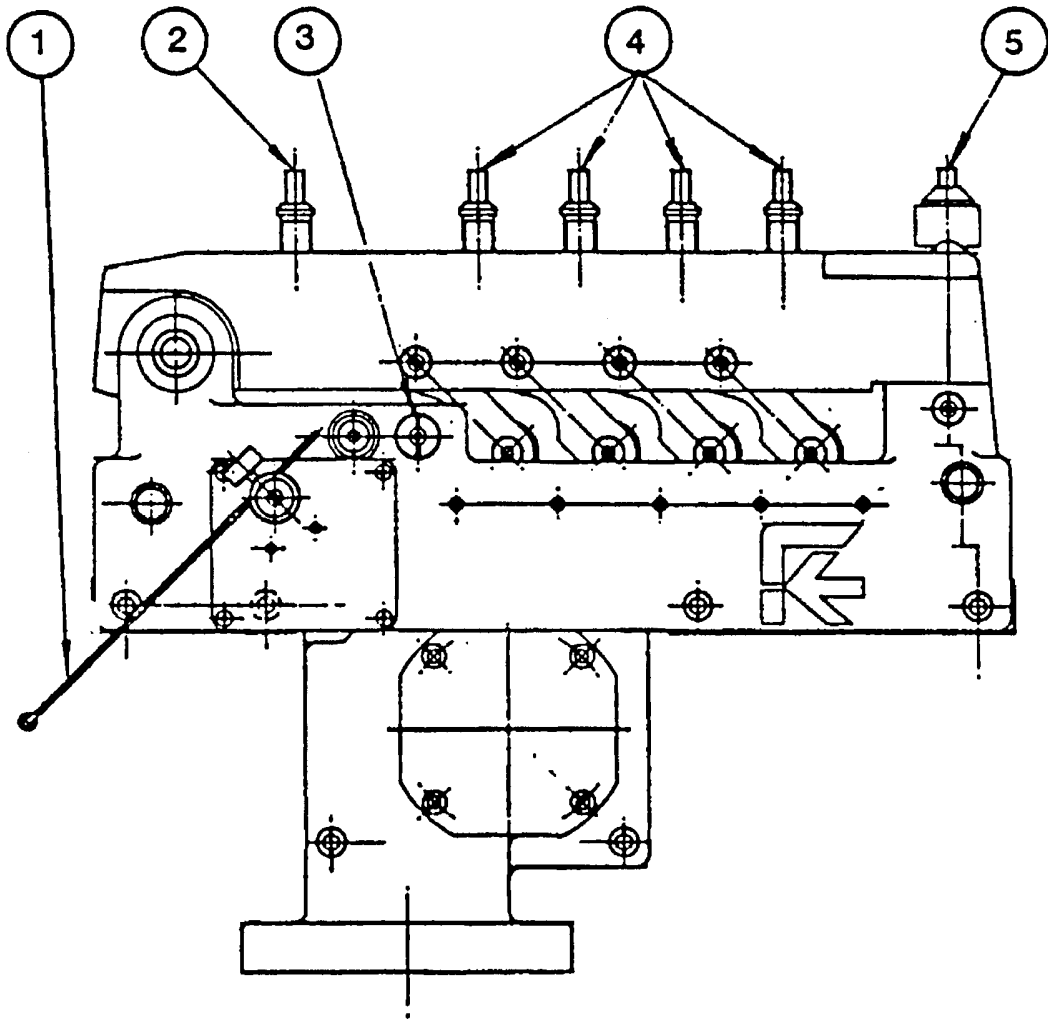
Max thickness increases by same percentage as stock width decreases - up to max. of 150%.

#### **LUBRICATION**

Worm gear reducer: Use Mobil 600W cylinder oil or equivalent. Reservoir capacity is 4 oz. Oil should be changed every 2000 hours. Fill to oil level plug.

Gear transmission: Use Mobil 600W cylinder oil or equivalent. Reservoir capacity is 4 oz. Oil should be changed every 2000 hours. Fill to oil level plug.

Grease fittings: Use Mobilux No. 2 or equivalent.



1. Loop Control Arm
2. Pinch Roll Adjustment
3. Eccentric Trunion
4. Idler Roll Adjustment
5. Cover Latch

## **RAPID ROLL**

### **OPERATION**

For set up only, place a short length of stock about four feet long on the bottom rolls, between the pinch rolls. Set the entrance guide rolls to maintain stock position. Make sure the top rolls are retracted. To prevent stock deformation apply light pinch roll force on the stock to insure adequate assisting pulling force on the stock and to prevent slippage of the stock while operating. Never overload the pinch rolls. This could damage the stock by extrusion causing permanent deformation.

The dancer arm position for height and range is operator selectable through the setting of thumbwheels. The speed of the Rapid roll rollers is automatically controlled by the position of the dancer arm.

As the dancer arm is raised the Rapid Roll rollers increase in speed. This minimizes starting and stopping and resultant stock deformation.

### **CAPACITY**

The model P1V is designed for 1.5" maximum width and .0005 to .075 thick material. The P4V is designed for 4" maximum width and .0005 - .060 thick material. The P8V is designed for 8" maximum width and .0005 - .050 thick material.

The maximum feed rate for P1V, P4V & P8V is 700 inches per minute.

The maximum feed rate for P1M-P8M is 1400 inches per minute.

### **ELECTRIC MOTOR**

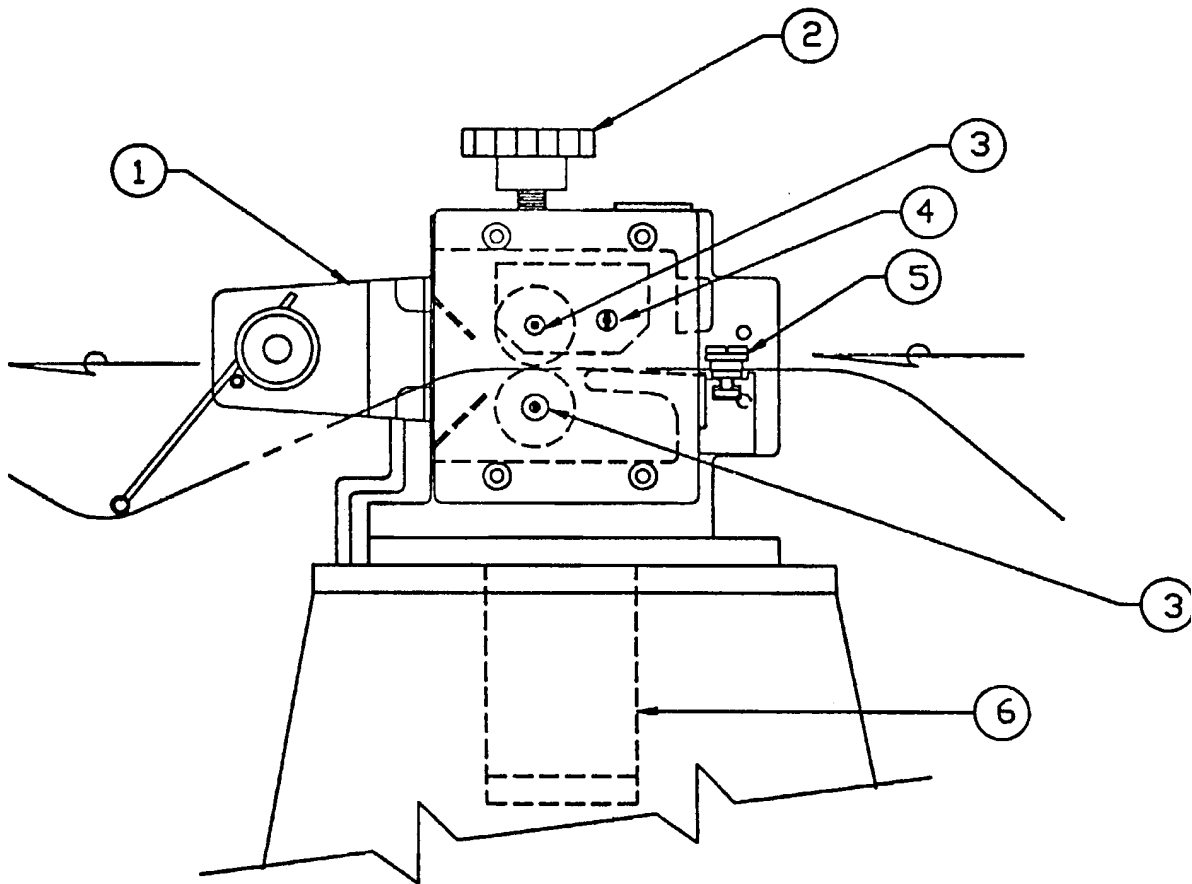
P1V, P4V, and P8V Rapid Rolls are furnished with a 1/4 HP - 2500 RPM permanent magnet motor. Input power is single phase, 115 volt A.C. Rotation must be clockwise as viewed from shaft end. The P1M, P4M & P8M have a 1/2 HP motor.

### **LUBRICATION**

Gear transmission oil - Use mobil 2000 SSU, 100 degree F 600 W cylinder oil or equivalent. Rapid Roll worm gear case (above motor) 4 oz. Capacity (Fill to level plug.) Change every 1000 hours of operation.

### **GREASE FITTINGS**

Use mobilux number 2 or equivalent.



1. Loop Control Arm
2. Pinch Roll Knob
3. Grease Zircs
4. Eccentric Trunion
5. Entrance Guide Rollers
6. D.C. Drive Motor

## **TROUBLESHOOTING GUIDE**

### **MAIN SWITCH ON BUT NOT LIT**

1. CB tripped
  - a. Reset CB
2. Unit not plugged into main power.
  - a. Plug into main power source
3. No power in incoming line.
  - a. Check outlet
  - b. Check power cord.
4. Loose wiring
  - a. Check terminals and connections

### **MOTOR CREEPS IN STOP POSITION**

1. R1 & R3 pot on 69100034 board not correctly adjusted.
  - a. Readjust pots so tables stops. Call factory.

### **UNIT TURNS BUT WON'T JOG**

1. Selector switch not in jog position
  - a. Select jog.
2. Jog pot on 69100076 board not adjusted correctly
  - a. Adjust pot. Call factory
3. Maximum speed pot on Ramm board set too low.
  - a. Adjust pot.

### **UNIT ON BUT MOTOR WON'T RUN. (ARMATURE VOLTAGE PRESENT - ON RAMM BOARD)**

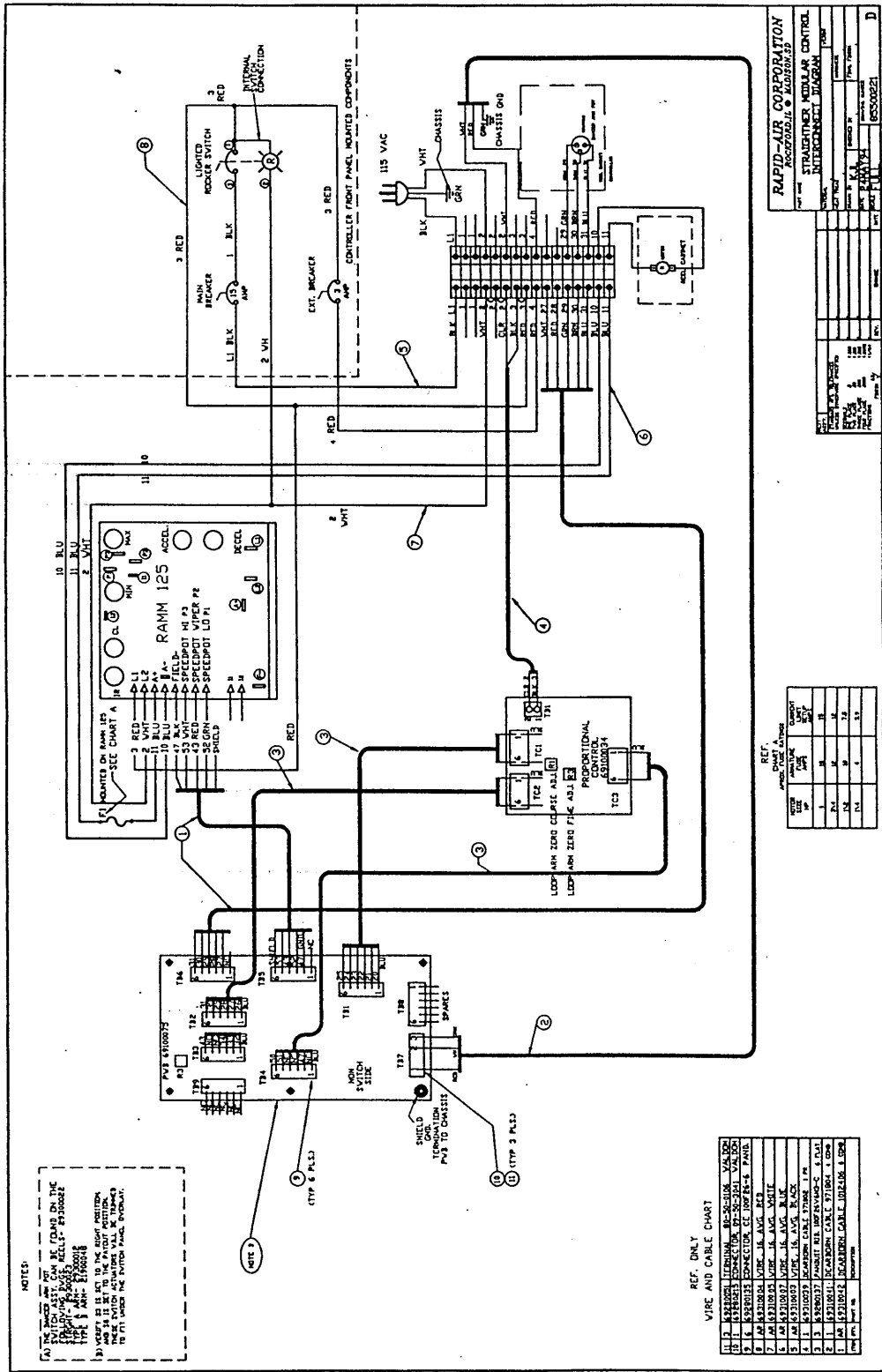
1. Check motor wiring and fuse.
  - a. Replace motor cord and correct motor wiring. Call factory.
2. Check motor.
  - a. Worn brushes or motor defective. Call factory.

NOTE: Refer to drawing RA-2 for location of components, sequence check from Ramm board to motor.

### **UNIT ON BUT MOTOR WON'T RUN. (NO ARMATURE VOLTAGE ON RAMM BOARD)**

1. Selector switch not in run position.
  - a. Turn selector switch to run position
2. If running with dancer arm control
  - a. Check that the external/loop arm switch is in the loop arm position.
3. If running with external control
  - a. Check that the external/loop arm switch is in the external position.
4. Height switch setting too high.
  - a. Set height setting to "0".

5. Percent speed pot set too low.
  - a. Adjust percent speed pot to 100%.
6. Fuses blown.
  - a. Check fused & circuit breaker.
7. No AC voltage at DC drive board.
  - a. Check wiring.
8. Check signal voltage between P2 to I2 on DC drive.
  - 0-6 VDC - Ramm
  - 0-9 VDC - Regen Drive
  - while moving dancer arm
    - a. If there is a signal, check continuity between I1 & I2
    - b. If no continuity, replace D.C. drive or call factory.
9. Check line voltage input of 69100034 board, 120 VAC, TB-1.
  - a. Check wiring. Call factory.
10. Check pico fuse 69100034 board (f1).
  - a. Replace fuse, 1 amp pico fuse - Call factory.
11. Check for 0-12 VDC between pin #1 (+V) and pin #2 (GND) of panduit connector TC3 on board #69100034.
  - a. In no voltage present call factory.
12. Check for DC voltage between pin #6 (VO) and pin #2 (GND) or panduit connector TC3, on board 69100034, while moving the dancer arm from minimum to maximum position.
  - a. If voltage is present, turn power off and check the ribbon cable connections between panduit connector #TC3 of 69100034 board and panduit connector #TB4 of 69100076 board. This should be a continuity check for tight connections. Call factory for assistance.
  - b. If voltage is not present move on to step 13.
13. Check voltage between pin #5 of TB-6 & pin #3 of TB-5 on 69100076 board while moving the dancer arm from minimum to maximum position.
  - a. If voltage varies 2.5-4 volt from minimum to maximum position the dancer arm pot is OK, but the 69100076 board could be defective. Call factory.
  - b. If voltage does not vary when moving the dancer arm from minimum to maximum position - call the factory for assistance.



NOTES:

(A) THE POINTS OF CONNECTION ARE TO BE FOUND ON THE DRAWING OF THE MAIN POWER SWITCH ASSEMBLY - 97300002Z

(B) THE POINTS OF CONNECTION ARE TO BE FOUND ON THE DRAWING OF THE MAIN POWER SWITCH ASSEMBLY - 97300002Z

(C) THE POINTS OF CONNECTION ARE TO BE FOUND ON THE DRAWING OF THE MAIN POWER SWITCH ASSEMBLY - 97300002Z

(D) THE POINTS OF CONNECTION ARE TO BE FOUND ON THE DRAWING OF THE MAIN POWER SWITCH ASSEMBLY - 97300002Z

REF. ONLY

WIRE AND CABLE CHART

WIRE NO.	TERMINAL	DESCRIPTION	WIRE NO.	TERMINAL	DESCRIPTION
1	1	115 VAC	1	1	115 VAC
2	2	CHASSIS	2	2	CHASSIS
3	3	CHASSIS GND	3	3	CHASSIS GND
4	4	CHASSIS GND	4	4	CHASSIS GND
5	5	CHASSIS GND	5	5	CHASSIS GND
6	6	CHASSIS GND	6	6	CHASSIS GND
7	7	CHASSIS GND	7	7	CHASSIS GND
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9	9	CHASSIS GND	9	9	CHASSIS GND
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96	96	CHASSIS GND	96	96	CHASSIS GND
97	97	CHASSIS GND	97	97	CHASSIS GND
98	98	CHASSIS GND	98	98	CHASSIS GND
99	99	CHASSIS GND	99	99	CHASSIS GND
100	100	CHASSIS GND	100	100	CHASSIS GND

RAPID-AIR CORPORATION  
 STRAIGHTENER MACHINE CONTROL  
 INTERCONNECTING DIAGRAM

WIRE NO.	TERMINAL	DESCRIPTION	WIRE NO.	TERMINAL	DESCRIPTION
1	1	115 VAC	1	1	115 VAC
2	2	CHASSIS	2	2	CHASSIS
3	3	CHASSIS GND	3	3	CHASSIS GND
4	4	CHASSIS GND	4	4	CHASSIS GND
5	5	CHASSIS GND	5	5	CHASSIS GND
6	6	CHASSIS GND	6	6	CHASSIS GND
7	7	CHASSIS GND	7	7	CHASSIS GND
8	8	CHASSIS GND	8	8	CHASSIS GND
9	9	CHASSIS GND	9	9	CHASSIS GND
10	10	CHASSIS GND	10	10	CHASSIS GND
11	11	CHASSIS GND	11	11	CHASSIS GND
12	12	CHASSIS GND	12	12	

**Rapid-Air Corporation  
RAMM  
SOLID STATE DC MOTOR  
Speed Control**

**SAFETY WARNING - PLEASE READ CAREFULLY**

This product should be installed and serviced by a qualified technician, electrician or electrical maintenance personnel familiar with its operations and the hazards involved. Proper installation (see instruction information which accompanies product), which includes wiring, mounting in proper enclosure, fusing or other overcurrent protection and grounding can reduce the chance of electrical shocks, fires or explosion in this product or products used with this product, such as electric motors, switches, coils solenoids and/or relays. Eye protection must be worn when working with control under power. This product is constructed of materials (plastics, metals, carbon, silicon, etc.) which may be a potential hazard. Individual material safety data sheets (MSDS) are available upon request. Proper shielding, grounding and filtering of this product can reduce the emission of radio frequency interference (RFI) which may adversely affect sensitive electronic equipment. If information is required on this product, contact our factory. It is the responsibility of the ultimate user of this product to read and comply with this safety warning. (SW effective 1/89).

**\*\*\*IMPORTANT\*\*\***

**YOU MUST READ THESE INSTRUCTIONS BEFORE OPERATING CONTROL**

1. Be sure AC line voltage corresponds to control voltage.
2. Install the correct Plug-In Horse power Resistor according to armature voltage and motor horsepower.
3. Recheck connections: AC line to L1 and L2; armature to A+ and A- and field (Shunt motors only to F+ and F-.) Note: If motor runs in improper directions, interchange armature leads).
4. Install proper AC line fuse and armature fuse as required.
5. Nominal trim pot settings are as follows (expressed in % of full CW rotations):

Table 1: NOMINAL TRIM POT SETTINGS

MIN (minimum speed): 15%	CL (current limit/torque): 65%
MAX (maximum speed): 65%	ACCEL (acceleration start): 20%
IR (IR compensation): 25%	DECEL (deceleration stop): 20%

## PLUG IN HORSEPOWER RESISTOR

A Plug-In Horsepower Resistor must be installed to match the RAMM to the motor horsepower and voltage. See table 2 for the correct value. Plug-In Horsepower Resistors are stocked by your distributor.

TABLE 2. PLUG IN HORSEPOWER RESISTOR CHART\*

MOTOR HORSEPOWER RANGE**		Plug-in Horsepower Resistor Resistance Value (ohms)	Rapid-Air P/N
Armature Voltage 90-130 VDC	Armature Voltage 180 VDC		
1/4	1/2	.05	69100529
1/2	1	.025	69100530
3/4	1-1/2	.015	69100534
1***	2***	.01	69100531

\* Motor horsepower and armature voltage must be specified when ordering so that proper resistor will be supplied.

\*\* For overlapping motor horsepower range use lower value Plug-In Horsepower Resistor.

\*\*\* Auxiliary heatsink must be used to achieve HP rating.

## INTRODUCTION

The RAMM full wave solid state DC motor speed control represents the latest state of the art design achievable through modern technology.

**Features include:**

**Integrated Circuitry**

Used to control and simplify command reference levels with both closed and open loop feedback to provide superior motor regulation. (Speed changed due to load, line voltage, or temperature variations are held to minimum levels).

**High Quality Components**

Selected and tested for proven dependability

**Transient Protection**

Used to prevent failure of the power bridge circuit caused by voltage spikes on the AC line.

**High Reliability**

When used in accordance with the instructions in this manual, the RAMM will provide years of trouble free operation.

A. Initial Setup and Wiring

1. General Instructions

1. Install proper size Plug in Horsepower Resistor. (see table 2)
2. The RAMM can be connected to a standard 120V or 240V 50/60 HZ AC line (be sure the AC input voltage corresponds to the control voltage rating and the motor rating. (e.g. 90-130 VDC motor on 120 VAC and 180 VDC motor on 240 VAC)
3. Follow the recommended supply wire sizes as per table 3.
4. Follow the NEC and other electrical codes that apply.

**CAUTION: SEPARATE BRANCH PROTECTION MUST BE PROVIDED ON 240V CIRCUITS.**

5. Connect control in accordance to connection diagram.

Table 3. Minimum supply wire size requirements

			MINIMUM WIRE SIZE (AWG) Cu only)	
MAX. MOTOR AMPS (DC amps)	MAX. MOTOR HP 90V	MAX. MOTOR HP 180V	MAX. MOTOR RUN	MAX. MOTOR RUN
6.0	1/2	1	16	14
12.0	1	2	14	12*
16.0	1 1/2	3	12	12

\*maximum recommended wire size

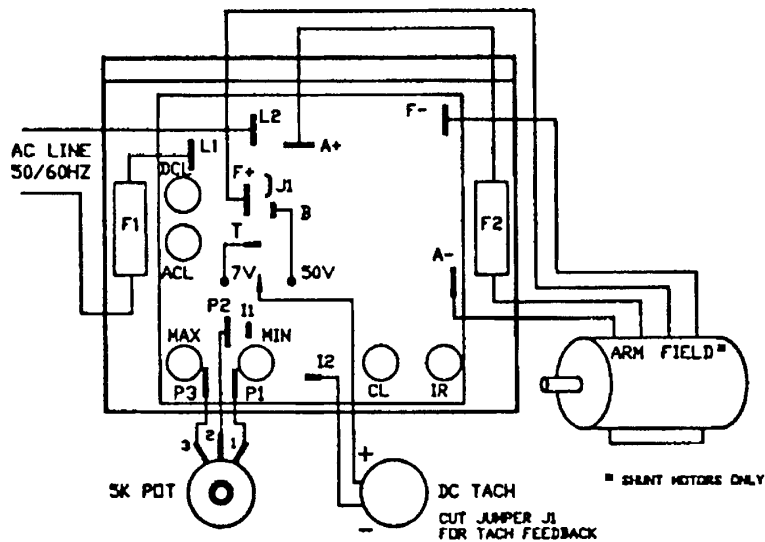


Fig. 1. Basic RAMM Connection Diagram

**Caution:** Do not bundle potentiometer connections (P1, P2, P3) and inhibit connections (I1, I2) with AC line or motor wires.

**B. Voltage Following.** All models can be controlled with an isolated analog reference voltage (0-6VDC) in lieu of the main speed potentiometer. The voltage is connected to P2 (+) and F-. The control output voltage will linearly follow the input voltage. The source impedance of the input should be 10K ohms or less. The Min trim pot can be used to provide the offset speed. If an offset is not required to adjust the Min to 0+ or 0- speed desired. The Max trim pot is rendered inoperative in the voltage following mode. Use auxiliary trim pot to limit the control range. If the input signal is not isolated, or is a current signal (4-20ma), the RAS1240D Signal Isolator must be used. It will allow direct connection to process controllers and microprocessors.

**CAUTION:**

1. The voltage feeding P2 and F- must be isolated from the AC line. Do not ground P2 or F- to set up a zero ground reference.
2. Do not bundle signal wires to P2 and F- with AC line motor connections. If signal wires are over 18", use shielded cables.

**C. FUSING.** The RAMM has provision for a built in AC line fuse and armature fuse. The AC line fuse protect the control against catastrophic failure. If the fuse blows, the control is mis-wired, the motor is shorted or grounded, or the RAMM control is defective. The armature fuse provides overload protection for the motor and control. Choose the proper size armature fuse by multiplying the maximum DC motor amps for 1.7. On domestic 240 Volt AC lines, separate branch circuit protection for each line must be used. All fuses should be normal blow ceramic 3AG or ABC or equivalent.

1. AC Line Fuse is chosen according to the maximum rating of the control:  
 12 Amp fuse for all motors up to 3/4 HP-90V and 1 1/2 HP-180VDC.  
 25 Amp fuse for all motors 1 and 1 1/2 HP-90V and 2 and 3HP-180VDC.

(Use Buss ABC, Littlefuse 326 ceramic fuse or equivalent.)

2. Armature Fuse can be chosen in accordance with the fuse chart. Note: This armature fuse is calculated based on the approximate full load DC current rating of the motor times a form factor of 1.5. If motor has characteristics not consistent with these approximations, a different fuse value may have to be used. Fuses are available from your distributor.

TABLE 4. ARMATURE FUSE CHART

90VDC MOTOR	180VDC MOTOR	APPROX. DC MOTOR CURRENT (AMPS)	FUSE RATING (AC AMPS)
HORSEPOWER			
1/4	1/2	2.5	4
1/2	1	5.0	8
3/4	1 1/2	7.5	12*
1	2	10.0	15
1 1/2	3	15.0	25*
*Also used as AC line fuse.			

## ADJUSTMENTS AND CONTROL FUNCTIONS

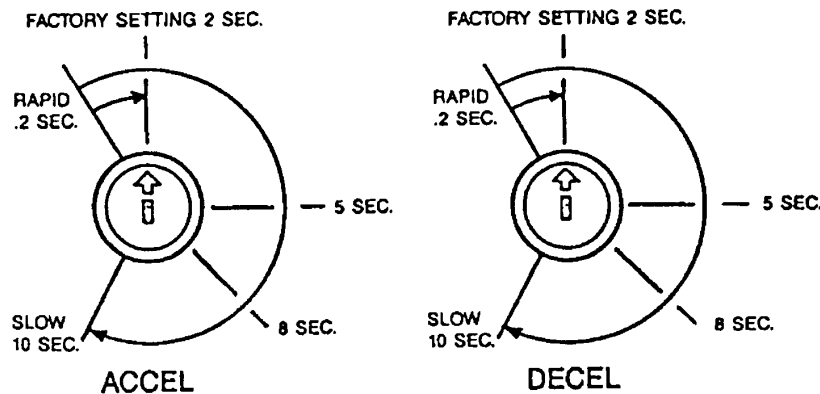
**WARNING: If adjustments are made under power, insulated adjustment tools must be used and eye protection must be worn.**

The RAMM has been factory adjusted to provide 0-full speed using the speed control knob. Minimum and Maximum speed trim pots are provided to change the speed from other than 0-full speed. The Acceleration (ACCEL) trim pot is provided to allow for a smooth start over the adjustable time period each time the AC power is applied or the speed pot is rotated. The DE-CEL trim pot controls the amount of ramp-down when the speed pot is adjusted to a lower speed. The Current Limit (CL, or torque output) adjustment is factory set to approximately 1 1/2 times the motor rating. The IR Compensation (IR) is factory adjusted to provide excellent motor regulations under normal operation.

NOTE: In order for the IR comp and CL trim pot settings to be correct, the proper Plug-in Horsepower Resistor must be installed for the particular motor and input voltage being used. Do not attempt to change the settings of the trim pots unless absolutely necessary since they are factory adjusted to near optimum settings.

The following procedure, presented in order of adjustment sequence, should be used when readjusting all trim pot functions.

Fig. 2. ACCEL/DECEL  
TRIM POT ADJUSTMENT



- A. Acceleration Start. The ACCEL is factory set at approximately .2 seconds. To readjust to different times, set the knob to the desired position as indicated in Fig. 2.
- B. Deceleration. The DECEL is factory set to provide a ramp-down time of .2 seconds. To change the ramp-down time, adjust the DECEL trim pot as indicated in Fig. 2.
- C. Minimum Speed Adjustment. If a higher than zero minimum speed is desired, readjust the minimum speed by turning the speed control knob to zero setting (full CCW position). Then adjust the Min. Speed Trim Pot to the desired setting.

NOTE: The min. speed adjustment will affect the max. speed setting. Therefore, it is necessary to readjust the max. speed after the min. speed is adjusted.

- D. Maximum Speed Adjustment. Turn Speed Control Knob to full speed (maximum CW position). Adjust max. speed trim pot to new desired setting.

NOTE: Do not attempt to adjust the max. speed above rated motor RPM since unstable motor operation may occur. For moderate changes in the max. speed, there will be a slight effect on the min. speed setting.

- E. Current Limit (CL/Torque Adjustment). CL Circuitry is provided to protect the motor and control against overloads. The CL also limits the inrush current to safe level during startup. The CL is factory set approximately 1.5 times the full load rating of the motor. (CL trim pot is nominally set to approximately 65% of full CW rotation).

To set the CL to factory specifications adjust as follows:

1. Set speed control knob at approximately 30-50% CW rotation.  
Set CL trim pot to full CCW position.
2. Connect a DC ammeter in series with the armature lead.
3. Lock shaft of motor (Be sure CL pot is in full CCW position).  
Apply power and rotate CL pot CW slowly until DC ammeter reads 1.5 times motor rating (do not exceed 2 times motor rating, Max. CW position.)

NOTE: If only an AC ammeter is available, it can be installed in series with the AC line. Follow above instructions; however, set AC amperage at .75 times motor rating.

- F. IR Compensation Adjustment. IR compensation is provided to substantially improved load regulation. If the load presented to the motor does not vary substantially, the IR factory adjusted to approximately 3% regulation. If superior performance is desired (less than 1% speed change of base speed from 0 to full load), then the IR comp. Should be adjusted as follows.

NOTES:

1. Excessive IR comp. will cause control to become unstable, which causes motor cogging.
2. For tach feedback applications the IR comp. can be set to minimum rotations (full CCW).

1. Set IR comp. trim pot at approximately 25% of CW rotation. Run motor unloaded at approximately 1/3 speed and record RPM.
2. Run motor with maximum load and adjust IR comp. trim pot so that the motor speed under load equals the unloaded speed per step 1.
3. Remove load and recheck unloaded RPM. If unloaded RPM has shifted, repeat procedure for more exact regulation.

The RAMM is now compensated to provide minimal speed change under large variations of applied load.

## **LIMITED WARRANTY - RAMM 125, 225, 225D**

For a period of one (1) year from date of original purchase Rapid-Air Corporation will repair or replace without charge devices which our examination proves to be defective in material or workmanship. This warranty is valid if the unit has not been tampered with by unauthorized persons, misused, abused or improperly installed and has been used in accordance with the instruction and/or ratings supplied. The foregoing is in lieu of any other warranty or guarantee expressed or implied, and we are not responsible for any expense (including installation and removal), inconvenience, or consequential damage, including injury to any person, caused by items of our manufacture and/or sale. Some states do not allow certain exclusions or limitations found in this warranty so that they may not apply to you. In any event, Rapid-Air Corporation's total liability, under all circumstances, shall not exceed the full purchase price of this unit.

## 69100034 TAUT STOCK OUTPUT

The 69100034 - Proportional control board has a taut stock output. This output must be wired to a solid state relay as the max current draw is 20 MA. The solid state relay's contact can then be incorporated into the electrical control circuitry.

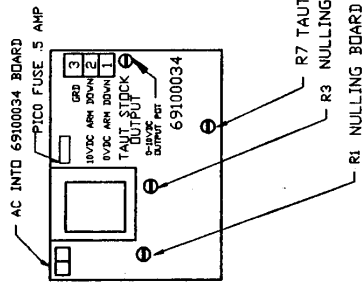
The output can be wired so that the relay is either on or off with the dancer arm down. When the dancer arm reaches the set point for taut stock, the relay switches state.

The taut stock height set point is set by raising the dancer arm to a position that the material is taut and then adjusting pot R7 so the output changes state. Lower and raise the dancer arm a few times to check that the set pint repeats and then the task is finished.

The potentiometer that is located just below the taut stock terminal strip is used for presetting the max voltage output requirement for a particular drive. A RAMM DC drive needs 6 VDC for max motor speed so turn the pot fully counter clockwise. A minarik drive board needs 10 VDC for max motor speed so turn the pot fully clockwise.

The following is a brief wiring diagram for the taut stock.

3	GRD.
2	10 VDC out with dancer arm down
1	0 VDC out with dancer arm down



**RAPID-AIR CORPORATION**  
 ROCKFORD, IL • MADISON, SD

PART NAME TAUT STOCK WRITE-UP DRAWING

MATERIAL WEIGHT

HEAT TREAT HARDNESS

DRAWN BY CHECKED BY FINAL FINISH

DATE DRAWING NUMBER

SCALE HALF REEL MOD B