

Rapid Air
Operating Instructions
High Speed Pallet Master

4601 Kishwaukee Street, Rockford, IL 61109
tele. 815-397-2578 * fax 815-398-3887

Rapid-Air Corporation
Operating Instructions
Pallet Master - PMD 25, 35, 50 & 100
High Speed

POWER

The system is designed to operate on 120 VAC 50/60 HZ power. The unit is provided with a power cord that distributes the power to a terminal strip located under the pallet reel dial plate. The power is then distributed to the proper control panel. The distributed power is circuit breaker protected and is intended as a power source for the Pallet Reel and any additional Rapid-Air accessory. Simply plug the main power cord into any grounded 120 VAC receptacle.

EMERGENCY STOP & POWER MONITOR INTERFACE

The system provides a control relay for emergency stop and power monitoring. These are controls provided to the user as an optional interface. If the user does not require or desire these features the system is operational as received from the factory.

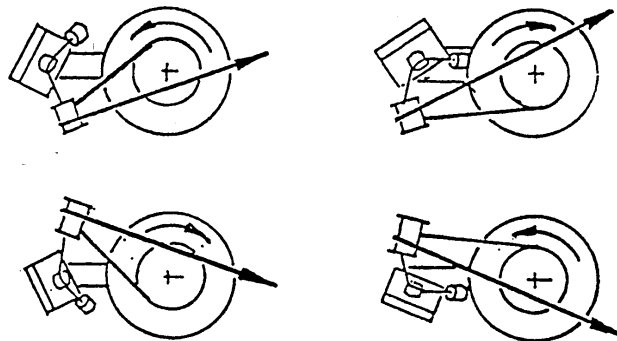
An isolated form "C" contact arrangement is provided for customer interface to monitor "emergency stop" or "taut stock" detection. The contact is terminated on the base terminal block (ref. Fig. RA-4/RA5) pin out is N.O. term-10; N.C. term-11; common term-12. The contacts are rated at .5 amps at 28 VDC.

SETUP & INSTALLATION

Determine the direction and rotation that the material shall decoil as it leaves the PMD. Position the PMD as close as possible to the end of the press.

Install the control arm assembly in the control head hub such that the counter weight is pointing toward the turntable. Position the control head and arm then lock in the appropriate exit side of the PMD.

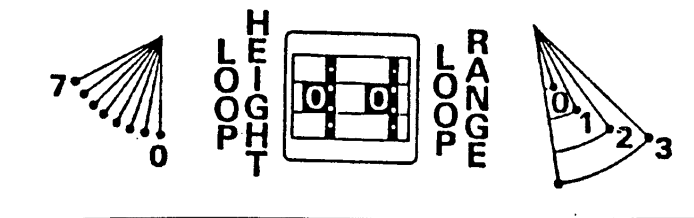
The following sketches will show the four basic decoiling arrangements. The choice depends upon such factors as weight, geometry of the material, C.W., or C.C.W. decoiling and available floor space.



Pre-Operation Check

Before placing any material on the turntable ensure that all functions are in the correct mode for machine operation. i.e.

1. Switch "OFF"
2. Run/Stop/Jog "stop" position.
3. Control arm arranged with counter weight toward the turntable at its max. extension.
4. Lock the control head.
5. Rotation directions switch to agree with the decoiling direction of the material on the pallet that is ready to be loaded onto the PMD.
6. Loop range at maximum 3".
7. Loop height—0.



8. Stock direction switch located just under the control arm pivot, switch to direction of material flow to the press.

Start up and Run Check

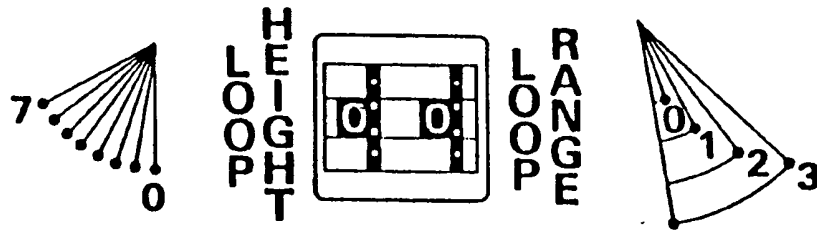
9. Switch "ON".
10. Run / Stop / Jog - "RUN"
11. Slowly push (rotate) the control arm toward the turntable to start the rotation.
 - (a) If the table turns in the wrong direction, reverse rotation direction switch.
 - (b) The turntable speed should increase as the control arm is moved toward the table.If otherwise. Reverse the stock direction switch.

Operation

12. Place the coiled stock on the turntable. Center the material on the turntable within 1/2 inch from center.
13. Rotate the table slowly by pushing the control arm toward the turntable. Unwind the first coil until the material can be threaded around the roller and back toward the press. The control arm and turntable will, now, operate automatically.
14. Slowly walk the material to the press. An alternate means of moving the material toward the press is the Run/Stop/Jog switch in repetitive Jog actuations. This may be a preferred method since this function overrides the control arm that may not be properly set at this time.
15. Run/ Stop/ Jog - “STOP”
16. Adjust the roller angle so that the material makes full contact.
17. Adjust the height of the control arm.
18. Adjust the counter weight to just offset the affect of the material loop so that the control arm will go back to the starting (rest) position when the press is not demanding material. (Refer to Inst #24 for loop height.)

Control Adjustments

19. Run/Stop/Jog: (see inst. #14)
20. Rotation directions: (see inst. #5)
21. Loop Range: This switch selects the sensitivity of the control arm travel from minimum to maximum speed in a narrow to a wide range depending upon the arm length of the control arm and press material demand.
22. Loop Height: This switch sets the start position in the arc of the control arm as it swings off of its mechanical stop.
(see dia. next page)



Electronic loop height adjustment

Eight different loop sensing arm operating positions are selected manually during set-up. In operation, the desired position is monitored and maintained electronically. Each separate position will move the operating angle of the arm so that top-to-bottom travel is located to accommodate specific material and loop height requirements.

Loop sensing arm operating range



30° - Loop sensing arm travels through a full 30° arc to vary turntable rotation speed from slow to full speed.



20° - Travel through a 20° arc changes rotation speed from slow to full speed.



10° - Slow to full speed varies as the loop sensing arm travels in a 10° arc.



5° - Only the first 5° of loop sensing arm travel is required to control turntable rotation from slow through full speed.

Instruction for wiring Pallet Master Decoiler after shipping

1. See drawing (fig RA-1)
2. Feed wires from base through hole in control arm.
3. Bolt control assembly to base with (4) 1/2-13 x 3/4 screws provided.
4. Take off control sub-panel access cover by removing (14) screws.
5. See drawing (fig RA-4) for 230 V system
See drawing (fig RA-5) for 110 V system
6. Connect wiring shown on drawing (fig RA-4) or (fig RA-5) which ever applies.
7. Replace cover.
8. Refer to Rapid-Air operating instructions to set up pallet master decoiler.

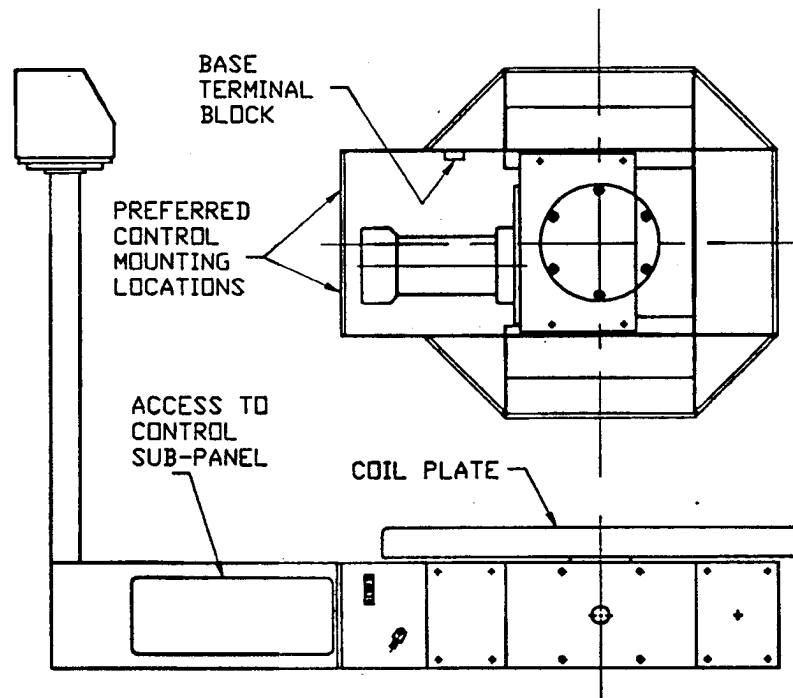
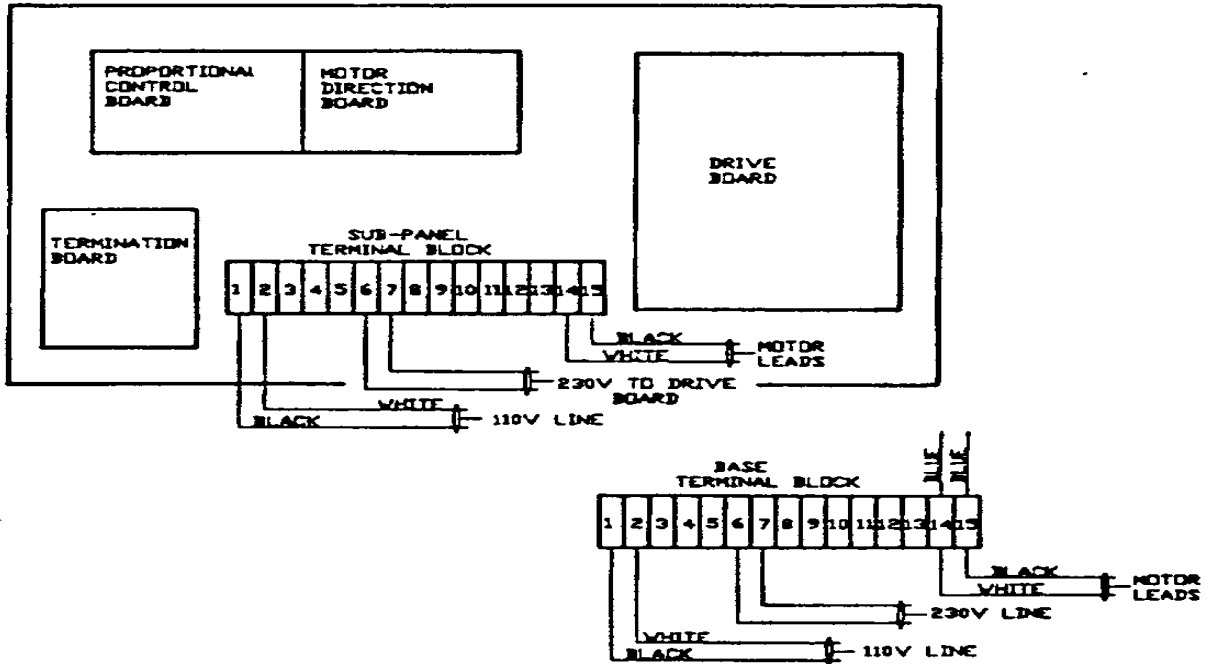
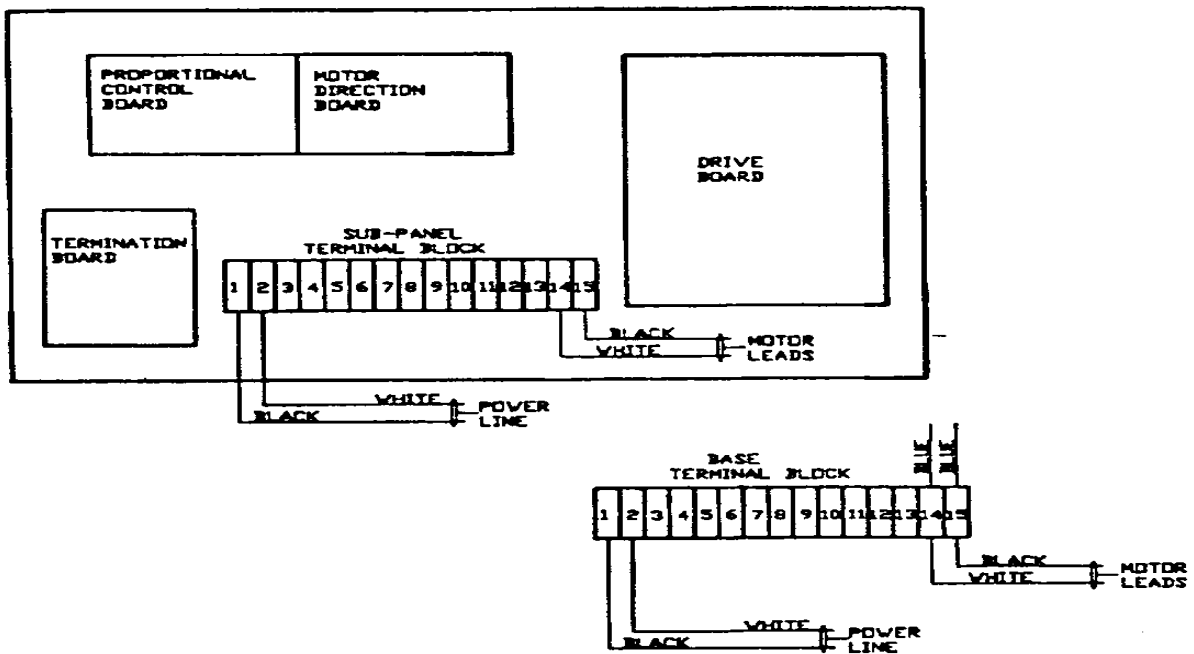


FIG. RA-1

Electrical Control Panel for 230 Volt System

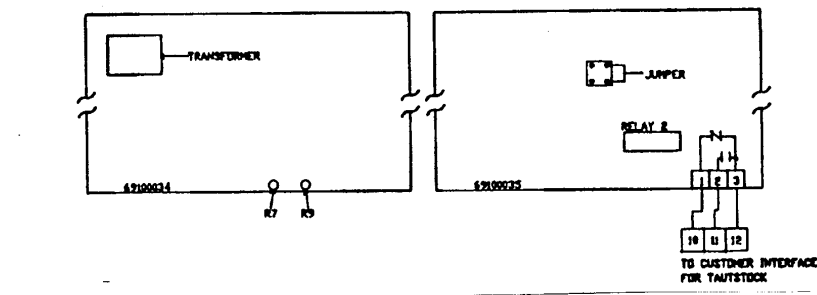


Electrical Control Panel for 110 Volt System



The **TAUT STOCK** feature is built into the Rapid-Air board #69100035 and wired to external terminals 10-11-12. The terminal #12 is common and from terminal 11 to 12 is a normally open contact with power on the unit. Terminal 10 to 12 is a normally closed contact with power on the unit. These contacts are from “relay 2” chip. See diagram. This relay has to be in place for taut stock to work. There is also a 4 prong post labeled “JUMP” that has to be connected so that relay 2 can be activated. To correctly apply the jumper, locate the post and then locate the plastic 2 prong jumper, ensuring that the right 2 vertical posts are covered. Once this is in place, the taut stock feature can be tuned.

To tune the taut stock, check that there are no connections on the terminals 10-11 & 12, except those that were factory connected. Attach an OHM meter to terminal 11 & 12 with the meter set to OHMS



Start the reel and raise the dancer arm so that the reel is running maximum speed. Raise the dancer arm up to a point that the stock would be taut. Hold the dancer arm at this position and adjust the pot “R7” of board 69100034 until the contact changes state. Release the dancer arm. The contact should return to normal state. Raise and lower the dancer arm 2 to 3 times to ensure that the contact functions properly. Disconnect the OHM meter and connect the customer interface. **CAUTION!** The contact rating of the relay is 10VA@ 0.5 amps max.

Rapid-Air Corp.

Minarik Adjustable Speed Control models RG100UC and RG200UC

Specifications

Input voltage

RG100UC 115 vac, 50/60 hertz, single phase

RG200UC 230 vac, 50/60 hertz, single phase

Maximum input current

15.0 amperes

Output armature voltage

RG100UC 0-90 vdc

RG200UC 0-180 vdc

Output armature current

10.0 amperes

Output Field Voltage

RG100UC 100 vdc

RG200UC 200 vdc

Output field current

1.0 ampere

Weight

3.1 pounds

Ambient Temperature Range

10-50 degrees C

Load regulation

With tachometer feedback 0.5% of base speed

Without tachometer feedback 8% of base speed

Horsepower rating

RG100UC 1/4 through 1 hp

RG200UC 1/2 through 2 hp

Safety Warning - Please Read Carefully

Improper installation practices can cause equipment malfunction or serious physical injury. This equipment must be installed, adjusted, and serviced by qualified electrical maintenance personnel familiar with the construction and operation of the equipment and the hazards involved. It is the responsibility of the individual installing the control to take diligent care during installation. Compliance with the National Electrical Code, any and all sound pertinent local electrical and safety codes, and the Occupational Safety and Health Act (OSHA) is required.

All exposed points on the control circuit board are HOT with respect to earth ground. The chance of electric shocks, fires, or explosions can be reduced by giving proper consideration to grounding, thermal and over-current protection, type of enclosure, and maintenance procedures.

These controls are NOT fail-safe. Control may cause the motor to run at full speed. The Speed Adjust Pot and the Regen Stop Circuit will be ineffective in these situations. BE SURE to provide an independent and positive means for disconnecting incoming AC power under emergency conditions.

General Considerations

Install in an area protected from dirt, moisture, and accidental contact. Provide adequate clearance for connection of wiring and adjustment of the controls. Do not mount the controls near other heat producing objects or in areas subject to excessive cold or vibration. Allow for adequate ventilation to maintain the ambient temperature within 10 to 50 degrees C.

Connections

The AC line, armature, and field circuits should be wired with 16 Ga or larger stranded wire. The Speed Adjust Pot Circuit may be wired with 18 GA stranded wire.

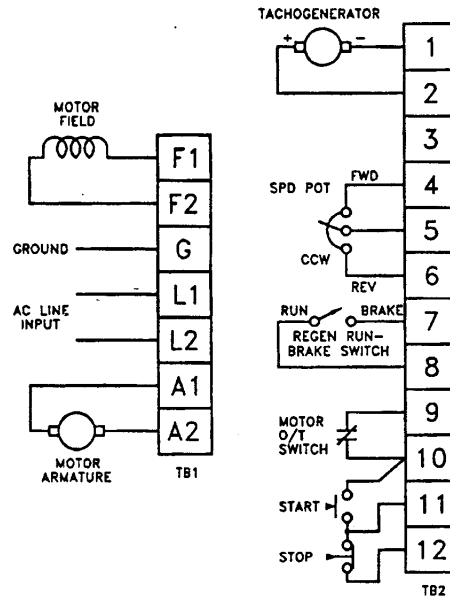
Connections are to screw-type terminal blocks.

WARNING - These controls are not isolated from earth ground. Unless an isolation transformer is used, circuit components are at a potential of 115 (or 230) volts above ground.

Speed Adjust Pot

DO NOT bundle the potentiometer leads or signal leads with any other load carrying wiring. If the potentiometer leads are over 18 inches in length you must use shielded wire to avoid erratic operation. If shielded wire is used, ground it at the Speed Control end only and not at the potentiometer end.

Connection Diagrams



Line Starting and Line Stopping

Connect a jumper between terminals 9 and 12. When AC line power is removed, the motor will coast to a stop. When power is re-applied, the motor will accelerate to the set speed at a rate determined by the Accel Adjustment trim pot setting.

Unidirectional Operation

For unidirectional operation, disconnect the reverse end of the speed pot from terminal 6 and connect it to terminal 3.

Motor Over Temperature Switch

Some motors are available with an internal thermostat which functions as an Over Temperature Switch. If not used, connect a jumper between terminals 9 and 10.

WARNING: If the O/T switch is used. Stop switches **MUST** be connected to terminals 10, 11 and 12 to prevent automatic restart of the motor.

Start and Stop Switches

These switches are not supplied with the control. The Start circuit requires a momentary operated normally open switch and the Stop circuit requires a momentary operated normally closed switch. When the Start switch is momentarily actuated, the motor will run. When the Stop switch is momentarily actuated, the motor will coast to a stop. To eliminate the start and stop switches, jumper terminals 10 and 12.

Regen Run-Brake Switch

The Regen Run-Brake switch is optional. When the switch is in the open position, the motor will run. When the switch is closed, the motor will be regeneratively braked to a stop. NOTE: The Run/Brake switch acts as an inhibit function and will not unlatch the Start/Stop pushbutton circuit.

Tachogenerator Feedback

Tachogenerator feedback is optional. Without tachogenerator feedback, load regulation is approximately 8% of base speed with a speed range of 10 to 1. This is quite acceptable for most applications which do not involve sizable load changes. With tachogenerator feedback, load regulation is better than 0.5% of base speed with a speed range of 30 to 1.

1. Clip resistors R5 and R6 from the lower board.
2. The control factory set for a tachogenerator rated at 50 volts per 1000 RPM, with a maximum motor speed of 1800 RPM. If the tachogenerator output is other than 50 volts per 1000 RPM, or the maximum speed of the motor is greater than 1800 RPM, calculate the value of R1 based upon V max - the tachogenerator output voltage at maximum motor speed. Note that V max must be at greater than 5 volts.

$$R1 = [(V/RPM)(RPM \text{ max})-5]+2.3, \text{ kohms}$$

Where

V/RPM = Tachogenerator volts per rpm, and

RPM max = Maximum tachogenerator speed in the application

Select a standard 1/4 watt resistor of the calculated value and insert it into the two terminal blaco TB# on the upper circuit board. If the calculated value is not available, select the next higher standard resistance and, after steps 3 and 4 have been followed, use the Max Speed Adjust trim pot to set the maximum speed.

3. Set IR Comp trim pot fully CCW.
4. Connect the tachogenerator leads to terminal 1 (negative) and terminal 2 (positive). Tachogenerator polarity is that produced with motor running in the FORWARD direction.

If any doubt exists concerning the tachogenerator polarity, start the motor very slowly. A mis-wired tachogenerator will cause the motor to accelerate to full speed. If this occurs, disconnect the control from the AC power immediately. Interchange the connections at terminal 1 and 2. Reconnect AC power to the control and recheck.

OPERATION

Before operating the control, carefully check that all connections are correct. Check that there are no wire chips or other foreign material on the printed circuit boards. Make sure that the input voltage is the same as listed on the control nameplate.

FIRST TIME STARTUP

1. Set the direction select Speed Adjust Pot to approximately its center position. If this pot is wired for unidirectional operation, set the pot to full CCW. Apply AC power to the unit.
2. If Regen Run-Brake switch is used, place it in the open position.
3. If Start and Stop pushbuttons are used press the Start button. (If not used, terminals 10 and 12 must be jumped.)
4. Slowly turn the direction select Speed Adjust Pot CW or CCW for the desired direction of motor rotation and speed. If the Speed Adjust Pot is wired for unidirectional operation slowly turn it CW to the desired speed. Verify that the motor starts slowly and increases speed in accordance with the potentiometer setting. If the control does not behave as expected, disconnect the AC power immediately and refer to the Troubleshooting Section of this manual.

OPERATING PROCEDURES

The motor may be started or stopped with the power line at any speed setting on the direction, select speed adjust pot or unidirectional speed adjust pot. When power is applied the motor will accelerate to the set speed and when the power is disconnected the motor will coast to a stop. For a fast stop the operational Regen Run-Brake switch should be used. When placed in the BRAKE position the motor will then be regeneratively braked to a stop.

For push button operation, the Regen Run-Brake switch must be in the open position. When the Start button is pressed the motor will accelerate in the direction and to the speed as selected by the direction select Speed Adjust Pot. (If the Pot is in the center position the motor will not begin to run until the Pot is turned off center.) If the speed adjust pot is wired for unidirectional operation the motor will accelerate to the speed selected. If the motor runs in the wrong direction, disconnect power from the control and interchange the leads to terminals A1 and A2.) When the STOP button is pressed the motor will coast to a stop.

CALIBRATION INFORMATION

SAFETY WARNING: Dangerous voltages exist on the printed circuit board. Contact with components and/or printed circuitry could cause serious injury or fatality. Please refer to and follow all Safety Warnings.

IMPORTANT:

A non-metallic screwdriver must be used when setting the trimpots to avoid any possibility of the screwdriver's blade contacting live circuitry and shorting the circuitry or allowing contact with any dangerous or fatal voltages.

Eight trim pots, located on the PC board, are provided for tuning the control to obtain optimum performance.

Two unlabeled trimpots have been added to the logic board. They are used only in the factory calibration procedure. Any changes made to these settings may seriously degrade the performance of the control and void its warranty.

MAX SPEED ADJUSTMENT

This feature is provided to allow maximum motor speed to be adjusted between 70 to 100% of motor nameplate rated speed when the direction select adjust pot is set at maximum for either rotation.

IR COMP ADJUSTMENT

Regulation is obtained by circuitry which raises the armature voltage to minimize speed loss with increased loading. This trim pot is factory preset fully CW.

FWD TORQUE AND REV TORQUE ADJUSTMENTS

These are provided for protection against excessive armature current, with current limited to approximately 120% of full load rating with factory set trim pots. Since current draw is usually highest upon start-up and acceleration, the setting of these trim pots can extend the acceleration time. **IMPORTANT:** Do not adjust either torque trim pot to a value higher than 130% of full motor current.

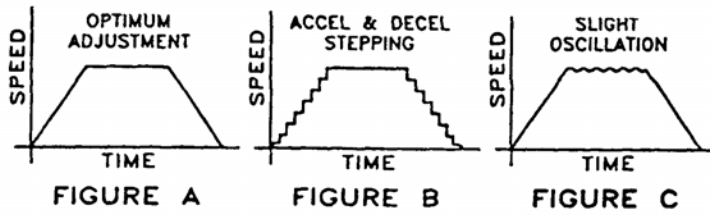
FWD ACCEL AND REV ACCEL ADJUSTMENTS

These trim pots set the amount of time required for the motor to accelerate from some speed to a greater speed in either direction. These are settable from 0.1 second through 15 seconds (approximately) from zero to full speed, depending on motor inertia. The actual minimum acceleration rate is dependent upon available torque. When operating in the reverse direction, the forward acceleration trim pot controls the deceleration time. When in the forward direction, reverse acceleration acts as forward deceleration. Turning the trim pots CW increase the Accel/Decel time.

CURRENT STAB ADJUSTMENT

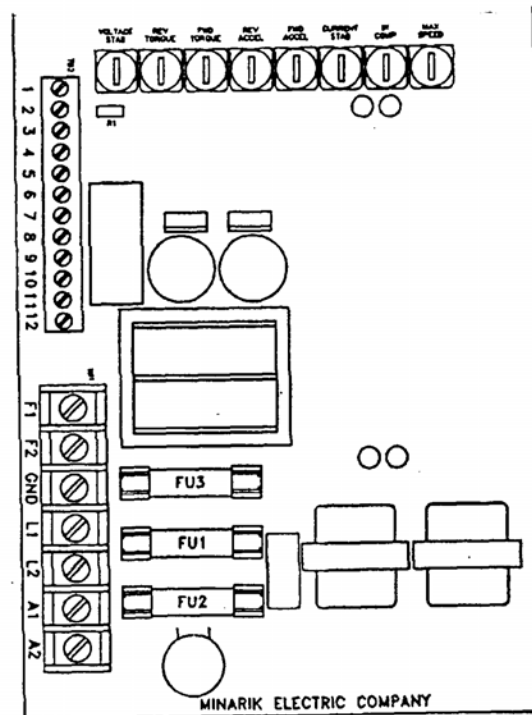
The effect of the adjustment is most apparent in the DC tachogenerator feedback operating mode. Current Stab is factory set at 50% of CW and should not required adjustment unless the tachogenerator signal has considerable ripple. Then, you should turn this pot CW until motor stabilizes.

Voltage Stab Adjustment



The effect of this trim pot is most obvious when tachogenerator feedback is utilized. When optimum adjustment of voltage stabilization is achieved, the speed profile through time should be smooth. (Figure a). If voltage Stab is set too low, stepping will occur in the Accel and Decel. It will be especially obvious in the Decel mode (figure B). If the Voltage Stab is set too high, you may see oscillation at a given set speed (figure C). This trim pot is factory set at 50% of CW.

Trim Pot Locations on Upper PC Board



Troubleshooting

The printed circuit boards in these controls are built utilizing the surface mount technology and are not considered to be field repairable. However, few problems originate from the printed circuit board. By following the procedures listed below, a trained service technician can troubleshoot and solve most problems.

Basic Considerations

Before proceeding check the following:

- 1) AC input power must be the same voltage as shown on the control nameplate.
 - 2) Check the motor nameplate for armature and field. With 115 VAC input the motor should have a 90 VDC armature and a 100 VDC field. PM motors do not have a field winding, and no connections to F1 and F2 should be made.
 - 3) Check that the terminal block connections are consistent with that shown on the connection diagrams.
 - 4) Check to see that the line fuse(s), F1 and F2, are the correct value (20 amperes normal blow) and are not blown. Also check the field fuse, F3, (1.5 amperes normal blow).
SAFETY WARNING: When changing these fuses the power line MUST be disconnected from the control to prevent contact with dangerous voltages which could cause serious injury or fatality.
- I. Heed and follow the safety warning at the beginning of the calibration information.
 - II. Set direction select speed adjust pot to its center position. If speed adjust pot is wired for unidirectional operation, set it at full CCW. Apply AC power. If field fuse blows, disconnect AC power from control and check:
 - a) Motor cable or motor field may be shorted or grounded. Disconnect F1 AND F2. A resistance reading across the motor field should read approximately 100 to 1000 ohms, depending on the horsepower rating of the motor. A reading from either side of the field to the motor frame should show open. (use high ohm scale)
 - III. Reconnect motor to control, reconnect power line to control and advance the direction select speed adjust pot to maximum FORWARD speed (full CW). If speed adjust pot is wired for unidirectional operation advance it to maximum speed (full CW).
 - a) If line fuse(s) blow:
 - 1) Motor armature or motor cable may be shorted or grounded. Disconnect AC power from control and disconnect A1 and A2. An ohmmeter reading across the motor armature should read approximately 1 to 100 ohms, depending on the horsepower of the motor. A reading from either side of the armature to the motor frame should show open (use high ohm scale).
 - 2) Motor field circuit may be open. Check for correct motor field resistance as described in II.a.

- b) If line fuse does not blow but motor will not run:
 - 1) Direction select speed adjust pot or unidirectional speed adjust pot may be defective.
 - 2) Control switches may be defective

IV. Motor will not reach desired speed.

- a) MAX SPEED trim pot may be set incorrectly.
- b) FWD TORQUE OR REV TORQUE trim pot may be set too low.
- c) If in tachogenerator mode, R! may be incorrect value.

V. Motor surges or pulsates.

- a) IR COMP trim pot may be set too high.

Tachogenerator Feedback Mode

I. Motor always runs at maximum speed.

- a) Tachogenerator output is wired opposite to the correct polarity. Reverse connections at Terminals 1 and 2
- b) Tachogenerator output is interrupted or nonexistent. Check continuity of leads. Replace the tachogenerator if defective.

II. Motor oscillates at all speeds.

- a) Check that the IR Comp trim pot is fully CCW.
- b) Adjust the Current Stab trim pot CW until motor smoothes out.
- c) Speed adjust pot may be open.

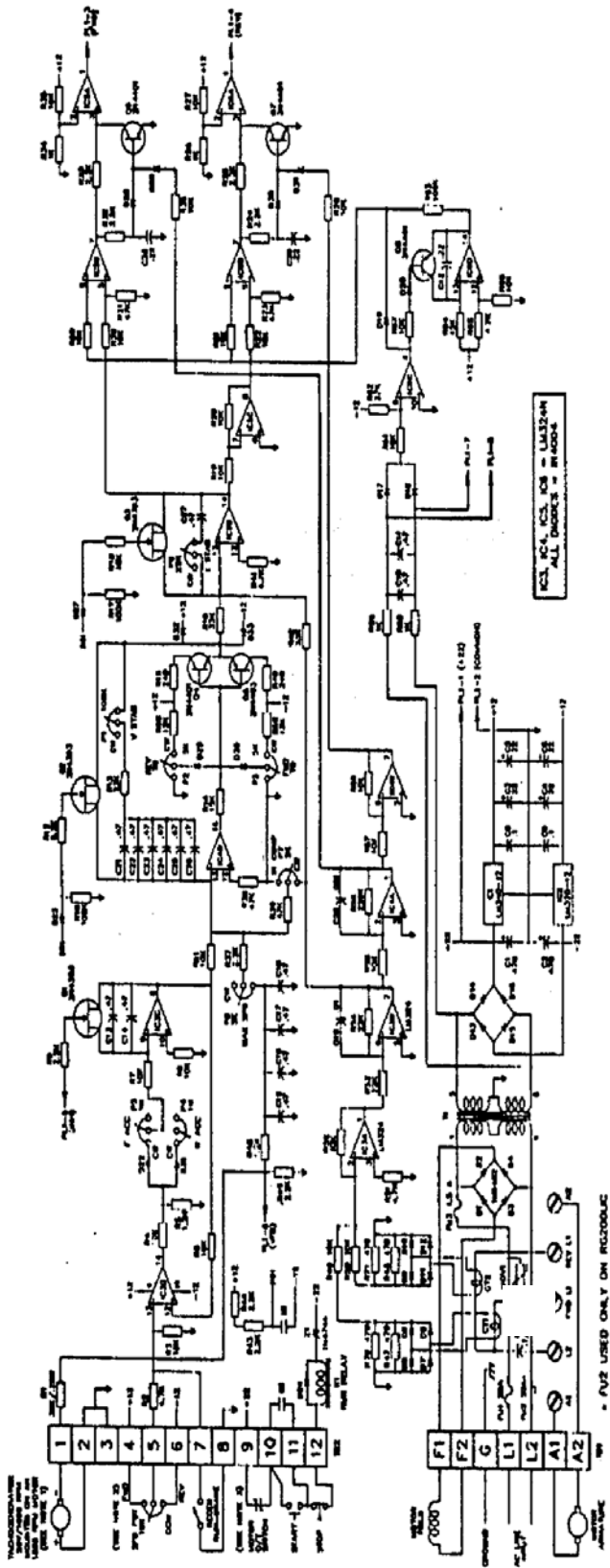
III. Motor oscillates at low speeds.

- a) Very gradually turn the VOLTAGE STAB trim pot CW until the oscillation ceases. (Unless this trim pot has been accidentally reset from its original calibration, you should not need to readjust it!)
- b) In the unlikely event that the oscillation is not completely eliminated by the voltage stab trim pot, slight resetting of the current stab trim pot may be necessary. (Unless this trim pot has been accidentally reset from its original calibration, you should not need to readjust it!)

LIMITED WARRANTY - RG100UC/RG200UC

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 prove 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 instructions 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.

SCHEMATIC

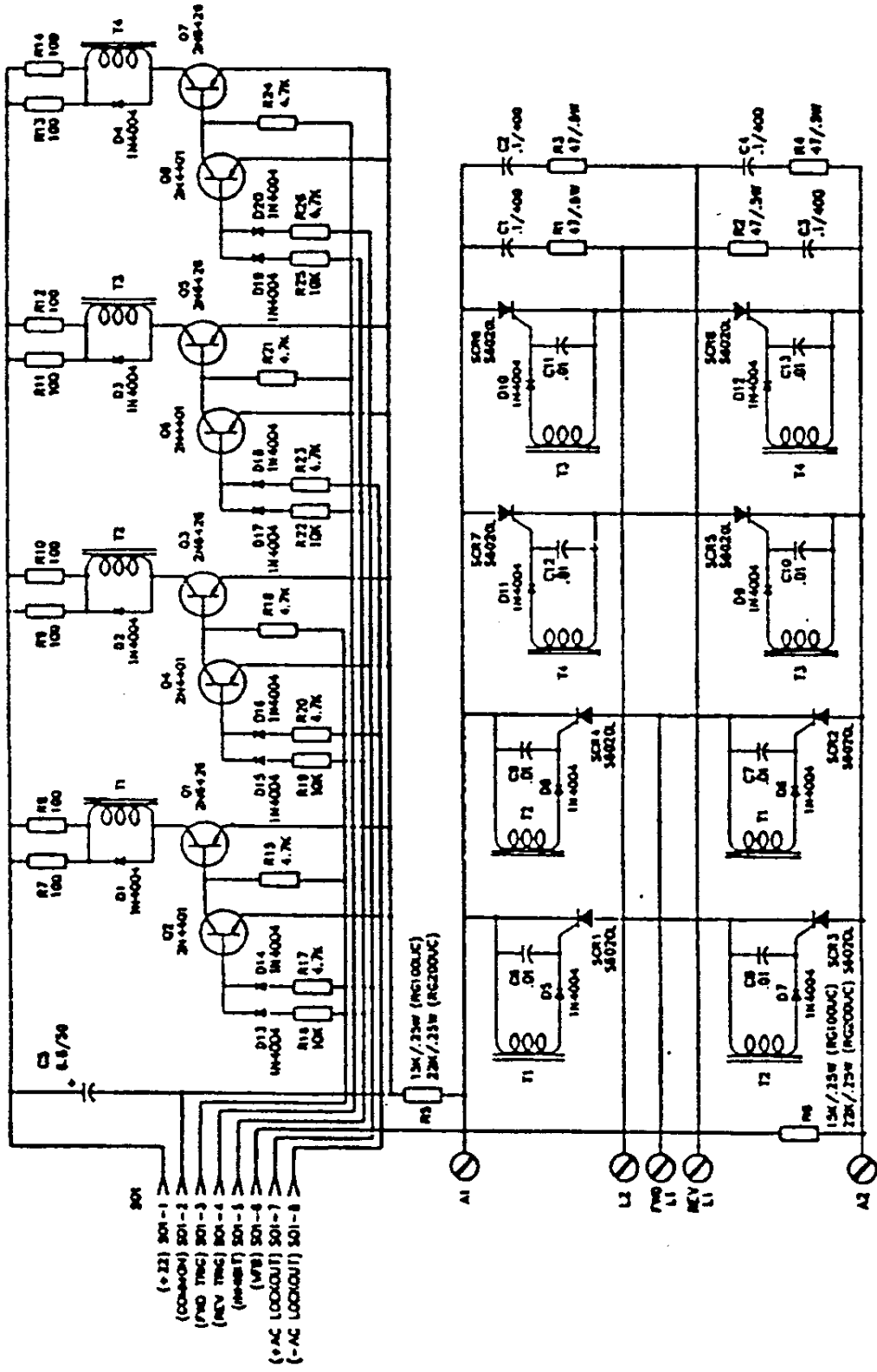


NOTE:

1. TACHOMETER FEEDBACK IS OPTIONAL. IF TACHOMETER IS USED, REMOVE R5 AND R6 FROM BOTTOM CIRCUIT BOARD. SELECT R1 (ON TOP CIRCUIT BOARD) TO GIVE 5 VOLTS ACROSS R45 AT MAXIMUM SPEED.
2. FOR UNIDIRECTIONAL OPERATION, RECONNECT REVERSE END OF SPEED POT TO TERMINAL 3.
3. MOTOR THERMAL OVERLOAD SWITCH IS OPTIONAL. IF NOT USED CONNECT A JUMPER BETWEEN TERMINALS 9 AND 10.
4. RESISTORS 0.1 WATT WITH VALUES IN OHMS UNLESS OTHERWISE SPECIFIED.
5. CAPACITOR VALUES IN MICROFARADS.
6. ENGINEERING CHANGES MAY HAVE BEEN MADE AFTER PUBLICATION DATE. ANY DEPARTURE FROM THIS DRAWING SHOULD BE CHECKED WITH THE FACTORY.

RG100UC (115 VAC)
 RG200UC (230 VAC)
 PAGE 1 OF 2 PAGES

SCHEMATIC (Continued)

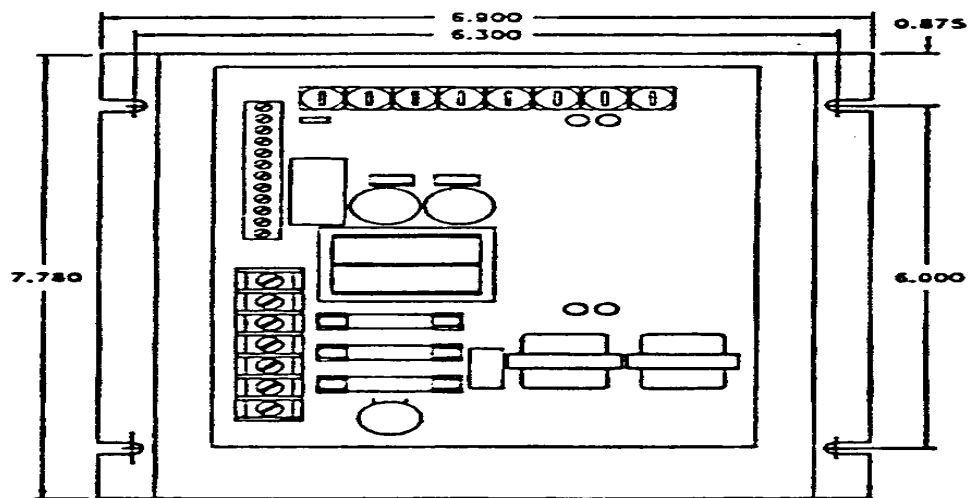


NOTE:

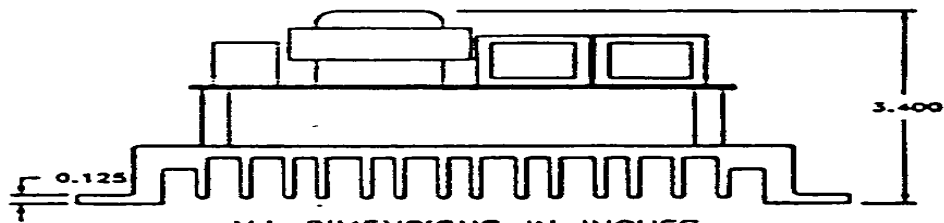
1. ALL RESISTORS 0.1 WATT WITH VALUES IN OHMS UNLESS OTHERWISE SPECIFIED.
2. CAPACITOR VALUES IN MICROFARADS.
3. ENGINEERING CHANGES MAY HAVE BEEN MADE AFTER PUBLICATION DATE.
ANY DEPARTURE FROM THIS DRAWING SHOULD BE CHECKED WITH THE FACTORY.

RG100C (115 VAC)
 RG200C (230 VAC)
 PAGE 2 OF 2 PAGES

DIMENSIONAL DATA



MOUNTING SLOT (4) 0.188" WIDE



ALL DIMENSIONS IN INCHES