



DUAL SWIVEL REEL OPERATING INSTRUCTIONS

MODELS

100 & 1000 SERIES

OPERATING INSTRUCTIONS DUAL SWIVEL REELS

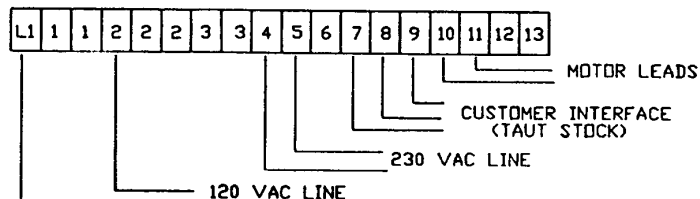
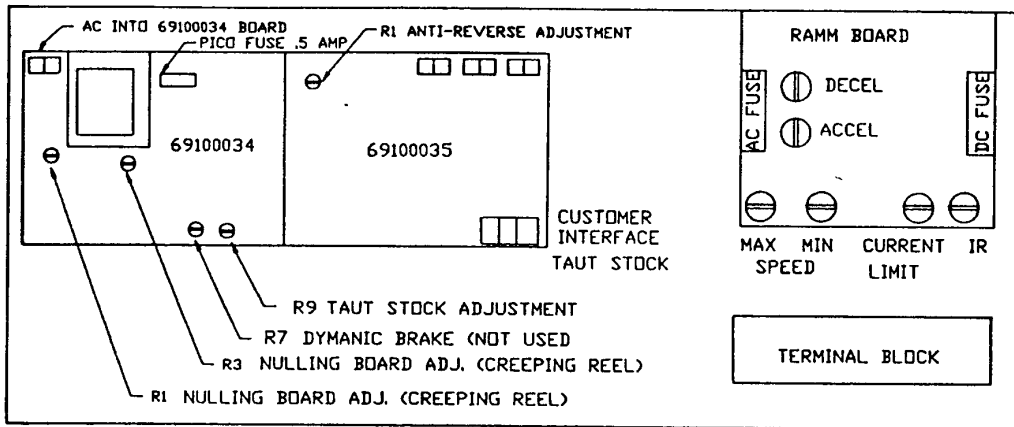
Installation

1. The machine that you have just received is fully assembled and ready to be put into position. Due to shipment vibration the machine should be checked to be sure all screws and bolts are tight. Visually inspect the machine for damaged parts due to shipment. If the machine is damaged in shipment, contact the carrier first to report the damage, and then Rapid Air.

2. Install the machine on a level surface with sufficient clearance for loading and unloading coils.

3. The machine is completely self-contained and need only be plugged into a 20 amp, 120 volt, 60 HZ outlet. If an extension cord is used as the source to the machine, it should be a minimum #12 wire to keep the voltage loss down and for electrical safety reasons.

The main control unit is located behind the side access cover. Fig. Man 14 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 can be ordered with 120 vac (1 phase) input. Terminal 4 & 5 will not be used and cannot be used unless the Ramm is changed to a 220 volt controller. If using 220 vac 1 phase input wire as indicated by drawing fig. Man 14. This unit cannot be used with 120 vac 1 phase input unless the Ramm board is changed to a 120 volt controller.



MECHANICAL OPERATING PROCEDURE

To Load or Unload a Coil Ring

- a) If your reel has fixed center shaft go to step 1.
- b) If your reel has an adjustable center shaft go to step 2.

Step 1

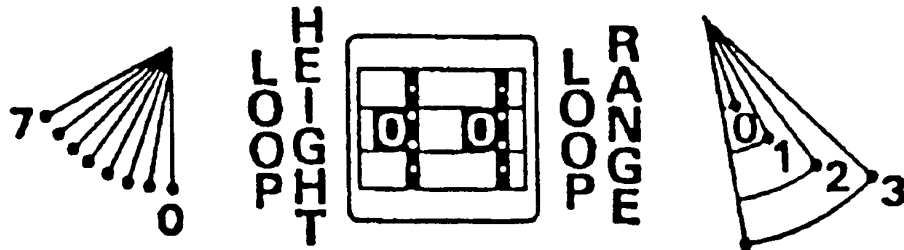
Release and remove the outer coil retainer from the shaft. Load or unload the coil ring. Replace and secure the outer coil retainer. The reel is now ready for production.

Step 2

Release and remove the outer coil retainer from the shaft. If unloading, adjust the centering arms to a position so that they will release the coil. Remove the coil ring. If loading, place the coil ring on the adjustable centering arms, adjust the centering arms until they are tight on the coil. Replace and secure the outer coil retainer. The reel is now ready for production.

The dancer arm was designed to operate from either side of the reel. The main reason for this was so the reel controls could be lined up on the same side as the punch controls.

To switch the dancer arm to operate on the opposite side that it is currently located on, first remove the counter weight if equipped with one, then turn the locking knob to disengage the lock on the dancer arm hub. Remove the dancer arm and relocate it to the other side. Turn the hub 60 degrees and insert the dancer arm into the slot. Set to desired position. Turn the locking knob until tight on the dancer arm. Then replace counter weight, if so equipped. The dancer arm is now ready for production running.



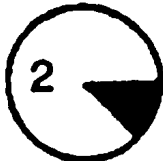
DANCER ARM LOOP HEIGHT ADJUSTMENT

Eight different loop sensing arm operating positions are selected manually during set-up. By incrementing the thumbwheel height switch, the zero point of the dancer arm is raised from its rest position to the angle shown (as indicated 0-7). The dancer arm will move from rest position to the angle selected before the pallet reel begins to rotate.

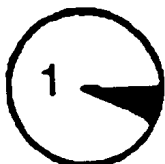
DANCER ARM LOOP RANGE FUNCTION



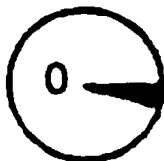
30 degree - Loop sensing arm travels through a full 30 degree arc to vary turntable rotation speed from slow to full speed as controlled by % speed pot.



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.



5 degree - Only the first 5 degrees of loop sensing arm travel is required to control turntable rotation from slow through 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 raised extended arm of the machine. It was installed to keep the operator clear of moving parts such as the reels. Located on the face of the console are four switches and one potentiometer which are explained below.

1. **Directional Control** - The direction control switch selects the direction the reels will turn, clockwise or counterclockwise. This is based on the operator facing the reel on the drive side of the machine.
2. **% Speed Pot** - The % speed pot adjust the maximum speed that the reels will rotate and should be set up to the production rate of the machine that it is coupled with for payout of rewind.
3. **“E” Control or Dancer Arm** - This selector selects between using the dancer arm or the external loop control. If the dancer arm is selected then another console located on unit A and B has to be set up, as explained later. If the “E” control was selected, then the external unit has to be plugged into the amp connector provided and prewired to the controller.
4. **On/Off Switch** - This switch is the main power switch for the controller. It must be “ON” for the machine to function.
5. **Master Start/Stop Push Button** - Once the main power has turned “ON” the operator will have to pull the red lighted mushroom push-button to activate the controls.

If the mushroom push-button is not lit at this time then the operator should check that the head position limit switch is activated. The reel cannot start unless the head is in position.

If the mushroom push-button is lit, the operator should keep his hand clear of the reel as the motor that drives the reel is activated. The reel will now rotate by lifting the dancer arm.

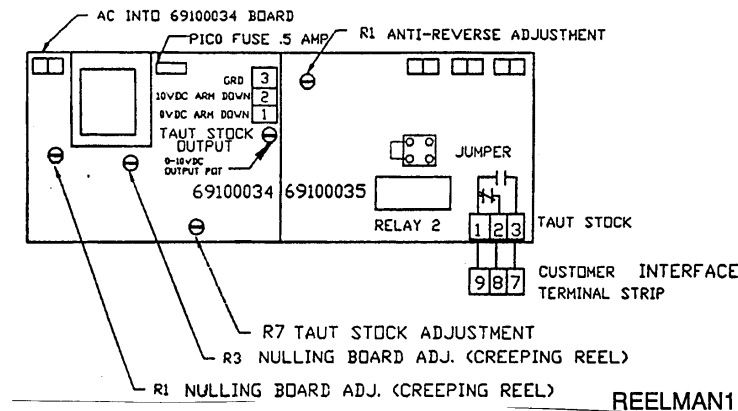
TAUT STOCK

The Taut Stock feature monitors the loop between the reel and the external equipment. If the loop gets small enough to possibly cause damage to the reel, the interface contacts change state and stop the external equipment.

If it is desired to monitor the reel then the following write up will explain how to connect and adjust this feature.

The Taut Stock feature is built into the Rapid-Air board 69100035 and wires to external terminals 7-8-9. The terminal #9 is common and from terminal 8 to 9 is normally closed contact with power on the unit. Terminal 7 to 9 is a normally open 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, insert the jumper so that the left 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 7 - 8 & 9, except those that were factory connected. Attach an OHM meter to terminal 9 & 7 with the meter set to Ohms.



Start the reel and raise the dancer arm so that the reel is running at maximum speed. Lower the dancer arm up to a point that the stock would be taut. Hold the dancer 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 insure 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. Refer to next page for 69100034 taut stock output.

TROUBLE SHOOTING 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 table stops. Call factory.

UNIT TURNS BUT WON'T JOG

1. Selector switch not in jog position.
 - a. Select jog
2. Jog pot on 69100053 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 TB-4 of 69100035 board. Terminal 1 & 2
 - a. If voltage not present replace 69100035 board. Call factory.
2. Check motor wiring
 - a. Replace motor cord or correct motor wiring. Call factory.
3. 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. Transition plug not installed.
 - a. If not using E control, install transition plug supplied with unit.
3. Thumbwheel height setting too high.
 - a. Set height setting to "O".

4. Percent speed pot set too low.
 - a. Adjust percent speed pot to 100%
5. Fuses blown.
 - a. Check fuses on D.C. drive board.
6. No AC voltage at DC drive board.
 - a. Check wiring.
7. Check signal voltage between P2 and I2 on DC drive, while moving dancer arm.
0-6 VDC - Ramm
0-9 VDC - Regen Drive
 - a. If there is a signal, check continuity between I1 & I2. If continuity, replace 69100035 board or call factory. If no continuity, replace D.C. drive or call factory.
8. Check line voltage input of 69100034 board, 120 VAC, TB-1.
 - a. Check wiring. Call factory.
9. Check pico fuse 69100034 board (F1).
 - a. Replace fuse - call factory.
10. Check for 0 - 12 VDC between pin #1 (+V) and pin #2 (GND) of panduit connector TC3 on board #69100034.
 - a. If no voltage present call factory.
11. Check for DC voltage between pin #6 (V0) and pin #2 (GND) of 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 #TC3 of 69100035 board and panduit connector #PT3 of 69100053 board. This should be a continuity check for tight connections. Call factory for assistance.
 - b. If voltage is not present move on to step 12.
12. Check voltage between pin #2 of TB-2 and pin #5 of TB-7 on 69100053 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 69100034 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.

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 over current 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 horsepower resistor according to armature voltage and motor horsepower.
3. Recheck connections: AC line L1 and L2; armature to A+ and A- and field (Shunt motors only to F+ and F-). (Note: if motor runs in improper direction, interchange armature leads.)
4. Install proper AC line fuse and armature fuse as required.
5. Nominal trimpot settings are as follows (expressed in % of full CW rotation):

Table 1: Nominal Trimpot 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 amplify command reference levels with both closed and open loop feedback to provide superior motor regulation. (Speed changes 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

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

Max. Motor Amps (DC Amps)	Max. Motor HP 90V	Max. Motor HP 180V	Max. Motor Run	Minimum Wire Size (AWG) Cu only 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

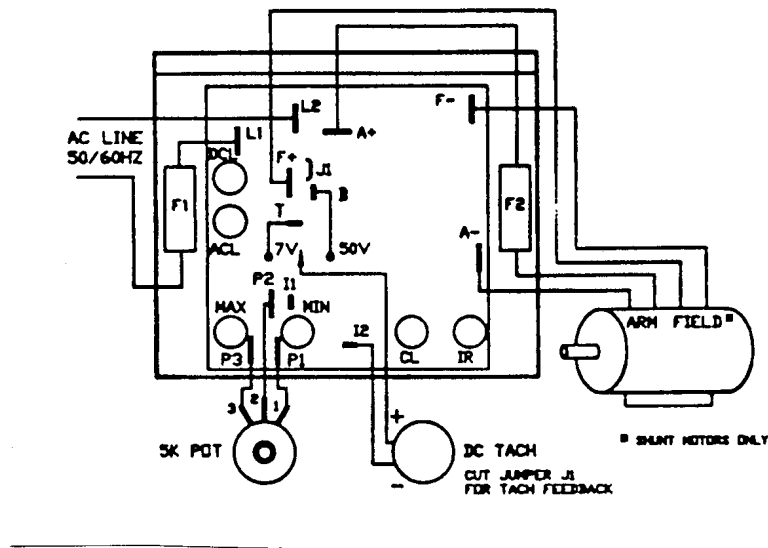


Fig. 1 Basic RAMM Connection Diagram

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 trimpot can be used to provide an offset speed. If an offset is not required adjust the min to 0+ or 0- speed as desired. The max trimpot is rendered inoperative in the voltage following mode. Use auxiliary trimpot 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 protects the control against catastrophic failure. If the fuse blows, the control is miswired, 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 by 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 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 1/2 HP-90V and 2 and 3 HP-180VDC.
 (Use Buss ABC, Littlefuse 326 ceramic fuse or equivalent.)
2. Armature Fuse can be chosen in accordance with the furs chart. Note: The armature fuse is calculated based on the approximate full load DC current rating for 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

90 VDC Motor	180 VDC 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	25*

*Also used as AC line fuse

ADJUSTMENTS AND CONTROL FUNCTIONS

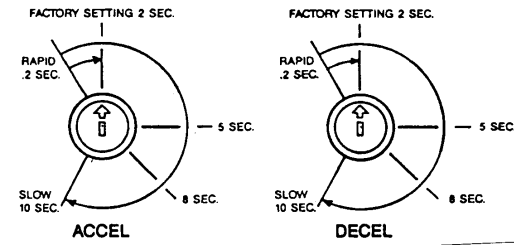
WARNING: If adjustments are made under power, insulated adjustment tools must be used and eye protection must be worn.

The Ramm has been factory adjusted to provide 0-full speed using the speed control knob. Minimum the Maximum speed trimpots are provided to change the speed from other than 0-full speed. The Acceleration (ACCEL) trimpot is provided to allow for a smooth start over an adjustable time period each time the AC power is applied or the speed pot is rotated. The Decel trimpot 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 regulation under normal operation.

NOTE: In order for the IR comp and CL trimpot 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 trimpots 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 trimpot functions.

Fig. 2 ACCEL/DECEL TRIMPOT ADJUSTMENT



- A. Acceleration Start. The ACCEL is factory set at approximately .2 seconds. To re-adjust 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 trimpot 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 trimpot 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 trimpot to new desired setting.

NOTE: Do not attempt to adjust the max. speed above the 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 in rush current to safe level during startup. The CL is factory set to approximately 1.5 times the full load range of the motor. (CL trimpot is nominally set to approximately 65% of full CW rotation).

To set the CL to factory specification adjust as follows:

1. Set speed control knob to approximately 30-50% CW rotation. Set CL trimpot for 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 instruction; however, set AC amperage at .75 times motor rating.

F. IR Compensation Adjustment. IR compensation is provided to substantially improve load regulation. If the load presented to the motor does not vary substantially, the IR adjustment may be set at a minimum level (approximately 1/4 of full setting). The control is 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.

NOTE:

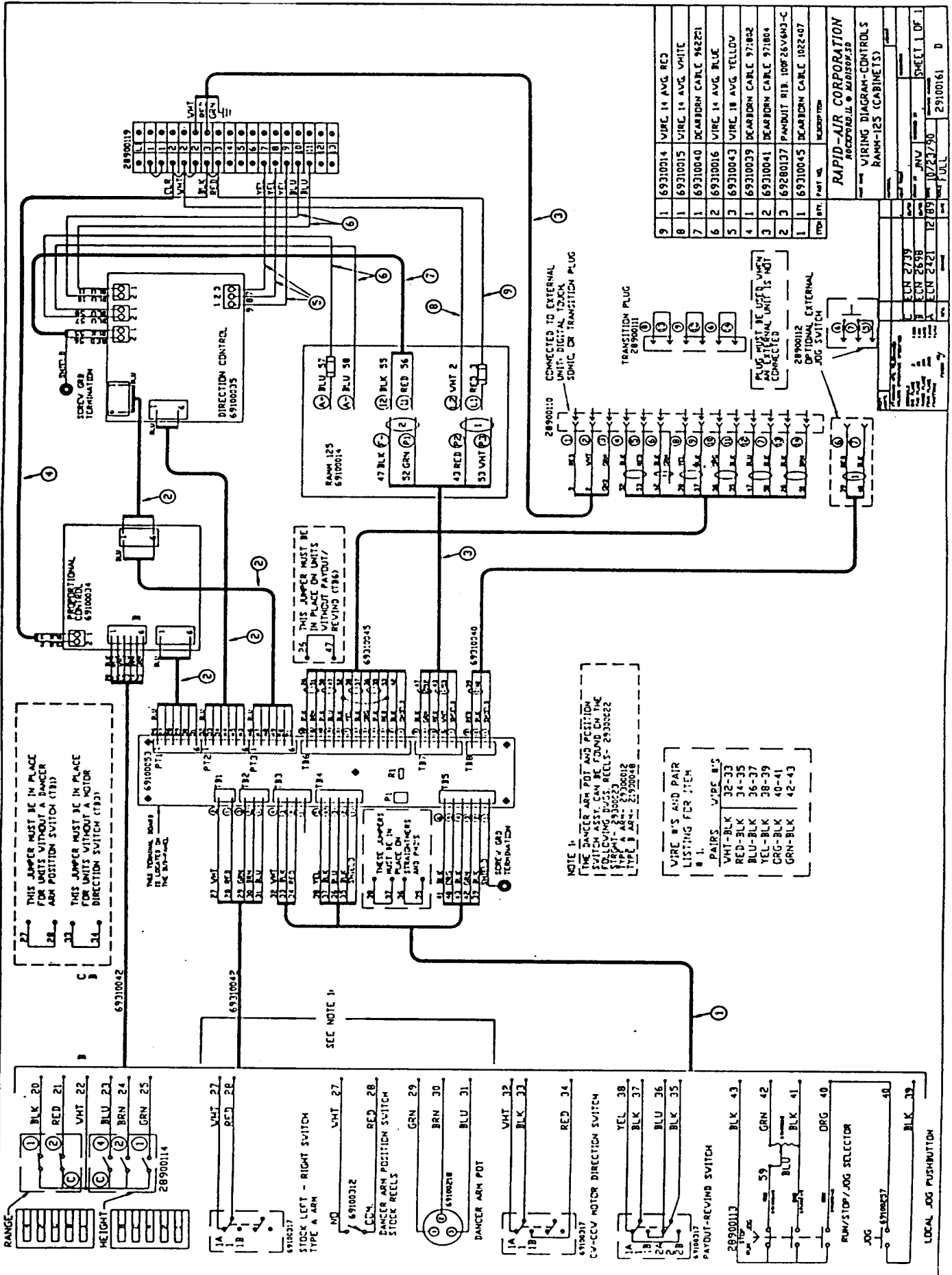
1. Excessive IR comp. will cause control to become unstable, which causes motor cogging.
2. For tach feedback applications the IR comp can be set to minimum rotation (full CCW).

1. Set IR comp. trimpot 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. trimpot so that the motor speed under load equals and unloaded speed per step 1.
3. Remove load and recheck unloaded RPM. If unloaded RPM has shifted, repeat procedure for more exact regulation.

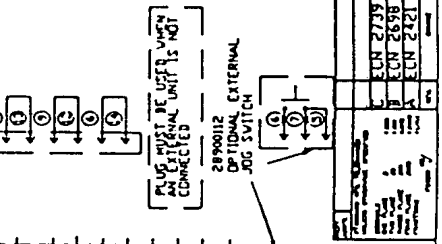
The RAMM is now compensated to provide minimal speed change under large variations of applied load.

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 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 or 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.



PAIR NO.	PAIR WIRE	DESCRIPTION
9 1	69310014	WIRE 14 AVG. RED
8 1	69310015	WIRE 15 AVG. WHITE
7 1	69310040	DEARBORN CABLE 942221
6 2	69310016	WIRE 16 AVG. BLUE
5 3	69310043	WIRE 18 AVG. YELLOW
4 1	69310039	DEARBORN CABLE 971862
3 2	69310041	DEARBORN CABLE 971864
2 3	69280137	PANOUT RIB. 100F26V6H3-C
1 1	69310045	DEARBORN CABLE 1022407



WIRE #S AND PAIR LISTING FOR ITEM # 1.	WIRE #S
VHT-BLK	32-33
RED-BLK	34-35
BLU-BLK	36-37
YEL-BLK	38-39
GRN-BLK	40-41
GRN-BLK	42-43

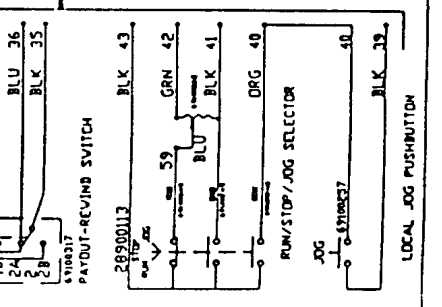
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RED-BLK	34-35
BLU-BLK	36-37
YEL-BLK	38-39
GRN-BLK	40-41
GRN-BLK	42-43

NOTE 1: THESE WIRE #S DO NOT INDICATE POSITION SWITCH ASSESS CAN FORMS FOLLOWING BUSES REELS-2330022C STRAIGHT-2330023C TYPE A ARM-2330012C TYPE B ARM-2330014B

THIS JAMPER MUST BE IN PLACE FOR UNITS WITHOUT A MOTOR DIRECTION SWITCH (FD3)

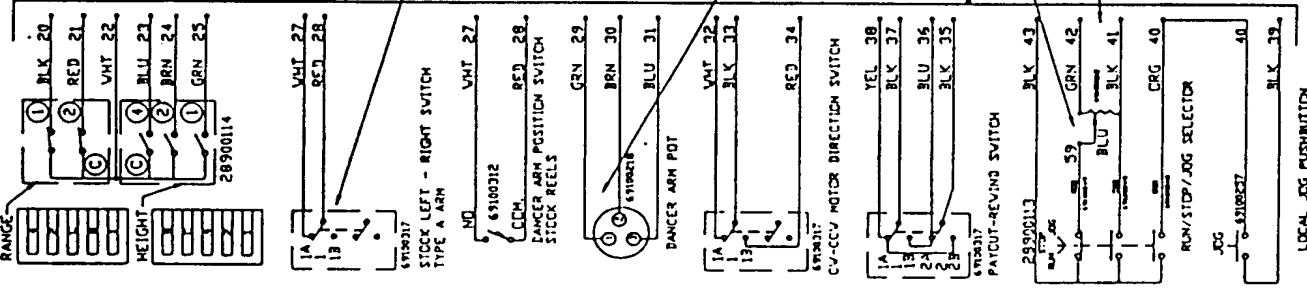
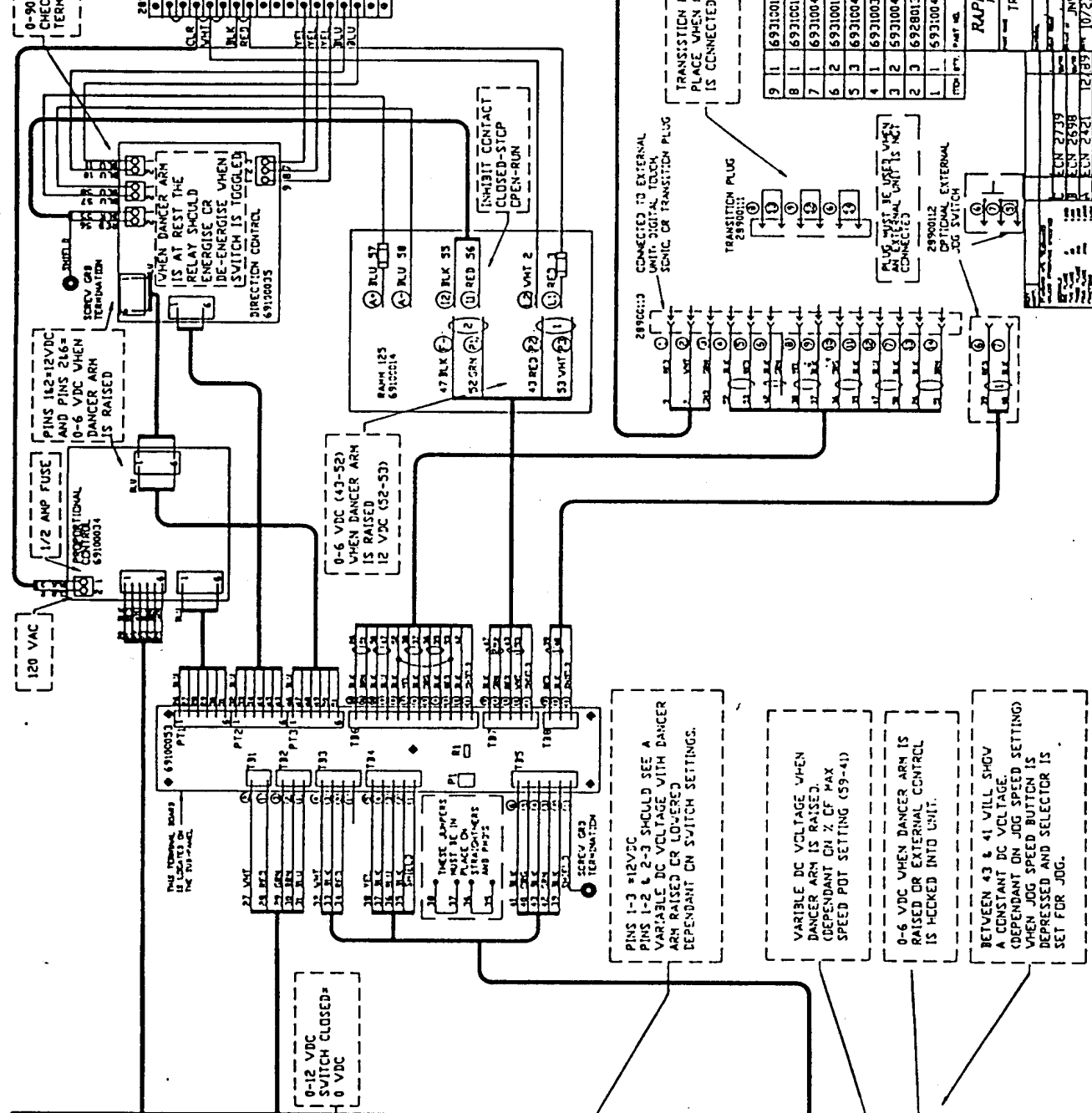
THIS JAMPER MUST BE IN PLACE FOR UNITS WITHOUT A DANCER ARM POSITION SWITCH (FB1)

THIS JAMPER MUST BE IN PLACE FOR UNITS WITHOUT PAYOFF/REVING (FB6)



WIRE #S AND PAIR LISTING FOR ITEM # 1.	WIRE #S
VHT-BLK	32-33
RED-BLK	34-35
BLU-BLK	36-37
YEL-BLK	38-39
GRN-BLK	40-41
GRN-BLK	42-43

0-90 VDC
CHECK BETWEEN
TERMINALS



9	1	69310014	WIRE 14 AVG RED
8	1	69310015	WIRE 14 AVG WHITE
7	1	69310040	SEARCHER CABLE #62201
6	2	69310016	WIRE 14 AVG BLK
5	3	69310043	WIRE 10 AVG YELLOW
4	1	69310039	SEARCHER CABLE 971802
3	2	69310041	SEARCHER CABLE 971804
2	3	69280137	PAUCUT RIB. 100F26V6W3-C
1	1	69310045	SEARCHER CABLE 1022407
			PART NO. DESCRIPTION

RAPID-AIR CORPORATION
ROCHESTER, N.Y. 14609
TROUBLE-SHOOTING DIAGRAM

ECN 2739
ECN 2658
ECN 2421
REV 1 OF 1
10/23/50
TRAVELER-34007

TRANSITION PLUG SHOULD BE IN PLACE WHEN NO EXTERNAL DEVICE IS CONNECTED TO THE UNIT

CONNECTED TO EXTERNAL UNIT. SIGNAL TO LOGIC. SIGNAL OR TRANSITION PLUG

TRANSITION PLUG 28900111

PLUG MUST BE USED WHEN EXTERNAL UNIT IS NOT CONNECTED

28900112 OPTICAL EXTERNAL JOG SWITCH

PINS 1-3 =12VDC DANGER ARM IS RAISED. VARIABLE DC VOLTAGE WITH DANCER ARM RAISED OR LOWERED DEPENDANT ON SWITCH SETTINGS.

VARIABLE DC VOLTAGE WHEN DANCER ARM IS RAISED. DEPENDANT ON % OF MAX SPEED POT SETTING (59-41)

0-6 VDC WHEN DANCER ARM IS RAISED OR EXTERNAL CONTROL IS HOOKED INTO UNIT.

BETWEEN 43 & 41 WILL SHOW A CONSTANT DC VOLTAGE. DEPENDANT ON JOG SPEED SETTING. WHEN JOG SPEED BUTTON IS DEPRESSED AND SELECTOR IS SET FOR JOG.

0-12 VDC SWITCH CLOSED = 0 VDC

STOCK LEFT - RIGHT SWITCH TYPE A ARM

DANGER ARM POSITION SWITCH STECK REELS

DANGER ARM POT

CV-CCV MOTOR DIRECTION SWITCH

PAUCUT-REVING SWITCH

RUN/STOP/JOG SELECTOR

JOG

LOCAL JOG PUSHBUTTON