

Rapid Air Corporation Operating Instructions

Multi-Stroke Control

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Multi-Stroke Control

The Multi-Stroke Control when coupled with a Rapid-Air feed increases the feed length by up to 9 times the original feed length capability

The control is completely self contained and requires only 3 interface points, which are provided on the outside of the electrical enclosure.

1. A cable connection that should be connected to the solenoid of the air feed.
2. A normally closed reset signal device, to reset the multi-stroke cycle.
3. An isolated normally open contact which is provided for customer interface of a work device such as a solenoid or relay that can be activated upon completion of a feed cycle.

Reset Signal Device:

The reset signal device should be a limit switch mounted on external equipment.

CAUTION-DO NOT STOP ON THE RESET SWITCH

The diagram 85500131, illustrates the proper interface connection of the switch to the controller at position (S2).

CAUTION-NO VOLTAGE SHOULD BE APPLIED TO THIS CONNECTION

Isolated Normally Open Contact:

At the completion of the feed cycle, a solid state relay is energized. The normally open contact provides a path to allow an external device to operate. The solid state relay will remain until the reset switch is tripped. The contact is rated at 0.5 AMPS/120 VAC.

The diagram 85500131, illustrates the proper interface connection at position (S1).

WARNING — THE CUT-TO-LENGTH CONTROLLER WAS NOT DESIGNED TO WORK WITH ANY DEVICES OTHER THAN A FEED CUTTER COMBINATION. IF CONNECTED TO OTHER THAN A FEED CUTTER COMBINATION, RAPID-AIR WILL NOT BE RESPONSIBLE FOR WARRANTY OR INJURY SUSTAINED BY THIS ACT.

The front of the multi-stroke unit has (9) components.

1. START/STOP POWER BUTTON:

Depressing the "START" button activates the unit.

Depressing the "STOP" button deactivates the unit.

2. STOP/RUN/START SELECTOR SWITCH:

In the STOP mode there should be motion or reset signal recognized by the circuitry. If the unit is cycling and the switch is turned to stop, the cycle in process will finish before stopping.

In the RUN, mode, the multi-stroke can be started by turning the selector to start and then releasing it.

3. FEED STROKES PER CYCLE SELECTOR SWITCH:

The position of the selector switch determines how many feed cycles are completed before the solid state relay is energized to allow the work cycle to begin. The minimum cycles is (1) and the maximum is (9).

4. FEED/CUT DELAY POTENTIOMETER

The feed rate potentiometer is a single turn potentiometer. By turning the knob clockwise, the cycle time will be shortened causing more strokes per minute. By turning the knob counter-clockwise, the cycle time will be lengthened resulting in fewer cycles per minute. If the rate is set too high (trying to cycle the feed at 200 strokes per minute when the feed is only capable of 160 strokes per minute) then severe mis-feeding will result. Cycling the feed too slow will simply reduce the parts per minute produced. Once the best setting is determined, note the setting for future reference.

There is a formula to calculate the maximum parts per minute (PPM) for a given feed.

The formula is $PPM = X / (2N - 1)$.

X= The maximum recommended cycles per minute of the feed.

N= The required number of feed cycles per part.

Example:

If it is desired to a 24" long part, having the feed adjusted to an 8" progression, the counter would be set for 3 progressions and the maximum recommended number of cycles per minute is 100, the maximum number of parts per minute would be $100 / (2 \times 3 - 1)$ or 20m parts per minute.

BOARD COMPONENTS AND TROUBLESHOOTING

There are two switches on the board for changing the operation of the cut to length.

1. The first switch is a bat or toggle switch. It is located just above the transformer of the board. When the switch position is to the left of the board then the air feed will run at a normal speed.
When the switch position is to the right of the board or facing the board connector then the speed of the cycle with the feed rate potentiometer set at "low" would be equal to the normal setting with the feed rate potentiometer set at "high".
 - A. Set bat switch left and turn feed rate potentiometer to high. Record cycles per minute
 - B. Set bat switch right and turn feed rate potentiometer to low. Cycles per minute should be about the same as in "A". Turn feed rate to high and record cycles per minute.
2. The second switch is a slide switch. It is located in the upper middle of the board. When the switch is set to the lower position, the control can be started by turning the selector switch from stop to start and then releasing it or by an input from the feed switch to start the cycle.
If the slide switch is set to the upper position, the control can only be started by a machine movement and that is not possible on an economy cut to length unit.

There are 5 lights on the board for trouble shooting purposes.

1. Light (L1) is the cycling light, whenever it is on, the air feed solenoid should be energized.
2. Light (L2) is the selector switch in run mode light, whenever the selector switch is in the run position this light will be on.
3. Light (L3) is the selector switch in start mode light, whenever the selector switch is in the start position this light will be off.
4. Light (L4) is the reset signal device input, if the unit is in run mode and the reset signal is activated, the light will be out for as long as the reset signal is present.
5. Light (L5) is the preset count complete, whenever the preset count, set with **strokes per cycle** selector switch has been reached, the light will be on and stay on until the reset signal has been activated.

There are 2 fuses on the board

1. Fuse (F1) is the fuse for the air feed solenoid and is a 5 amp Pico fuse.
2. Fuse (F2) is the main board fuse and is a 5 amp Pico fuse.

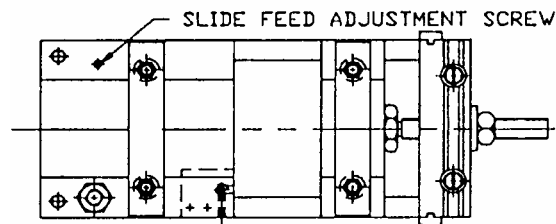
AIR FEED PROGRESSION SET UP

The feed guide rollers are adjustable by loosening the machine screws and moving the rollers to the desired position. For best results the stock should be centrally located in the feed.

The notches in the guide rails provide for coarse feed adjustment of the stop block. The final feed adjustment for stroke length is made by the screw in the center of the stop block. The final feed adjustment is aided by the use of accurately dimensioned spacers or gage blocks placed between the adjusting screw and the main cushion bolt, and with the air pressure turned on to keep the slide block tight against the main body.

With the air pressure off, the material is then inserted between the guide rollers and passed under the feed clamp. Lift the stock clamp and push the material through to the starting position. Turn on the air (75-120 PSI) and the feed is ready to operate.

The last adjustment, if necessary, would be the speed adjusting valve. The valve adjustment is located on top of the main body on the opposite side of the actuating valve. Adjust the screw for minimum impact by turning clockwise and for faster speed by turning counterclockwise. When the impact is high, slippage is possible resulting in poor repeatability and also part fatigue. Refer to the diagram below.



MAINTENANCE

The air feed needs very little maintenance. The most important part to watch is the air. Too much oil in the air or water in the air can cause the air feed to start running erratic. Screws should be checked periodically to be sure they are tight, this includes the switch mounting brackets, if present, as they can loosen up over time to the vibration and high impact movement of the air feed. A visual check of the air feed every morning before running it will give many hours of running time. If small problems are left unchecked, they turn into large problems and down time.

LUBRICATION

For a general guide for the air feed, the lubricator oil release adjustment should be set to one drop of oil for each 50-80 strokes. (See insert on lubrication of "O" rings.)

LUBRICATION OF "O" RINGS

The "O" Rings furnished with Rapid-Air feeds are made of a Buna N Compound designed to give long life on service with air, oil and water. This rubber compound features high abrasion resistance and good dimensional stability if the recommendations listed below are followed.

A filter and lubricator should be used; the filter to remove grit that would otherwise act as an abrasive, and the lubricator to provide an adequate quantity of oil. For best results, avoid excess of oil.

Paraffin base oils in general will give the best service. The viscosity should be 140-170 S.S.U., the API gravity 29.5 minimum and the aniline point between 150 F and 210F. Variation of the aniline point from the limits given is likely to cause either shrinkage or stretching of the "O" Rings.

Detergent motor oils and all other oils designed for automotive use are generally unreliable in chemical makeup for use with rubber compounds. Spindle oils are too low in viscosity.

The group of oils listed below are generally recommended for Buna N compound 366Y "O" Rings. This grouping is given in good faith but, because of the constant changes made in oils by the manufacturers, we cannot guarantee any consistency of chemical makeup. All of these oils have an aniline point of 210, and API gravity of 29.5 minimum and a viscosity of 140-170 S.S.U. The base stock is paraffin.

Recommended:

Cities Service Oil Co.	Pacemaker #1 (Standard hydraulic oil)
Standard Oil of Indiana	#5 Hydraulic Oil
Sun Oil Co.	Sunvix #916
Texaco	Regal A, R & O
Shell Oil Co.	Tellus #27
	Turbo #27
Sinclair Oil Co	Rubilene Extra Light
Atlanta Refining Co.	Hytherm Oil #C
New Jersey Lubricant Co	A-88/HNR
Standard Oil of Ohio	Sohivis #43
Mobil DTE	10W Hydraulic

RECOMMENDED LUBE FOR ASSEMBLY OF RAPID-AIR FEEDS MIXTURE OF LUBRIPLATE AND MOLYKOTE

No. 105 Lubriplate

Fiske Bros. Refining Co.
Newark, NJ - Toledo, OH

Molykote

Powder (Molybdenum disulfide)
Dow Corning Corp.
Midland, Michigan

To a 2 lb coffee can filled with lubriplate, add 2 tablespoons of moly kote and thoroughly mix.

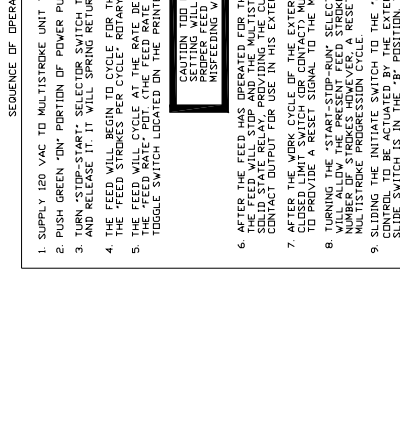
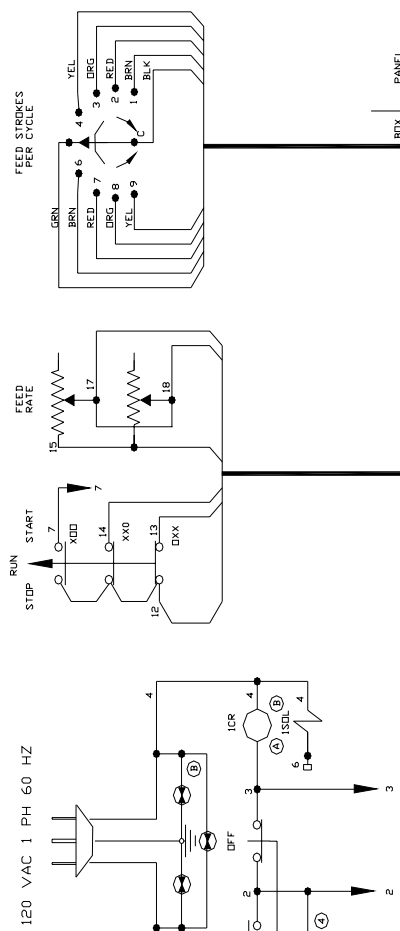
Loctite sealant is used on threaded parts type AV.

PROBLEM	POSSIBLE CAUSES	REMEDY
Feed and stock clamps work, but slide block does not move when actuating valve is depressed.	*Pilot operated valve is stuck	*Check for grit, swollen nylon or swollen "O" rings
Excessive leakage of air from exhaust hole beneath speed adjusting screw when actuating valve is in up position.	* Poppet not seating on bottom of valve hole. *Leaking of "O" rings #85, 83, 84, 88, 90 and 100	*Check for grit or chips *Check "O" rings #85, 83, 84, 88, 90 and 100. See assembly drawing 106 for location
Excessive leakage of air from exhaust hole, also sluggish operation of feed clamp pistons, actuating valve up.	*Leaking of "O" rings #85 and 90	*Check "O" rings #85 and 90. See assembly drawing #106 for location.
Excessive leakage of air from exhaust hole when actuating valve is in down position. (Note: that a slight amount of leakage is normal in this position.)	*Tight "O" rings or grit around pilot operated valve may prevent it from moving its full stroke. *Worn poppet. *Poppet in backwards	*Clean grit, cycle feed manually to break in "O" rings. *Insert new poppet *See feeds parts list #106 for correction orientation.
Stock clamp does not move up and down when actuating valve is depressed. Other operations appear normal.	*Worn "O" rings #96 around O.D. of stock clamp pistons.	*Replace "O" rings. See assembly drawing #106 for location.
Excessive leakage of air from actuating valve vent hole when actuating valve is in up position.	"O" Rings #103 beneath actuating valve retainer #31C is leaking.	*Install "O" rings beneath retainer - not in air groove. See assembly drawing #106.
Gradually reduced speed.	*Lack of oil *Low viscosity oil. *Speed adjusting screw turned in too far. *Oversized poppet.	*Adjust air/oil mixture. *Use lighter weight oil *Readjust screw *Clean poppet area; check for free fit
Excessive leakage of air from pilot operated valve vent hole on side of feed.	*Leaking of "O" rings #100, 101 or 102.	*Check "O" rings #100, 101 and 102. See assembly drawing #106 for location.
Cushion pistons act too slow and provide too much cushion	*Excessive oil, reduce supply	*Adjust air/oil mixture
Mist of oil coming from exhaust hole	*Excessive oil, reduce supply	*Adjust air/oil mixture

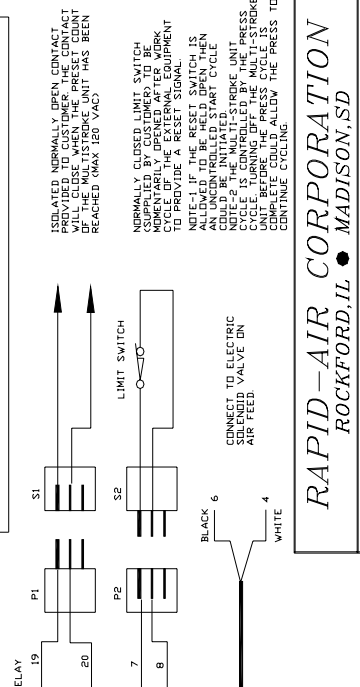
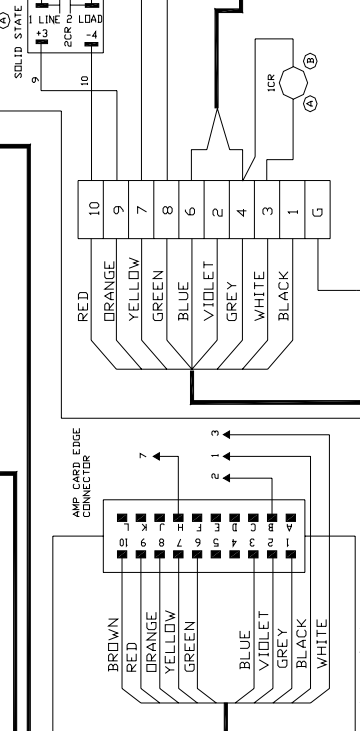
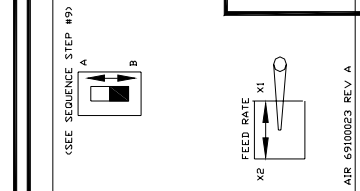
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PROBLEM	PROBABLE CAUSES	REMEDY
Feed has difficulty pushing last part of progression.	*Feed is not inline with die.	*A slight angular adjustment of the feed will reduce the binding of the stock on the die guides.
Over feeding	*Stock excessively dirty or oily. *Feed is operating too fast. *Stock and feed clamps may be loose.	*Clean unit and stock. Run and retest. *Turn speed adjusting screw clockwise to slow down *Although nuts are self locking, they can in time work themselves loose; retighten the nuts
Under feeding	*Insufficient air pressure. *Stock has large slitting burr. *Stock clamp and feed clamps are loose. *Feed is not lubricated. *Stock excessively dirty. *Feed may be feeding before punches are clear from stock or die. *Feed may be operating too slow.	*Adjust air pressure to between 80 and 100 PSI *Check clearance between clamps and stock *Although nuts are self locking they can in time work themselves loose; Retighten them *Check lubricator at air inlet, there should be oil in the bowl. *Clean away dirt which may be present between slide block and main body area. *Adjust the amount of depression of the actuating valve. *Turn speed adjusting screw counter-clockwise to increase speed
Slide block will move out okay, but will not return without hesitation	*Check speed adjusting screw. *Check pilot operated valve. Swollen "O" ring could be binding, until pressure build up breaks it free. Check poppet valve.	*Adjust for smooth operation. *Check moisture content in air lines. Change "O rings.
Feed acts sluggish on start up. Okay after running for a while.	*Check pilot operated valve for "O" rings binding. Valve should move freely in cartridge.	*This usually occurs after a period of non-running. After running unit for awhile the unit usually frees up okay.

120 VAC 1 PH 60 HZ



- SEQUENCE OF OPERATION
- SUPPLY 120 VAC TO MULTISTROKE UNIT THROUGH POWER CORD PROVIDED.
 - PUSH GREEN "DN" PORTION OF POWER PUSHBUTTON.
 - TURN "STOP-START" SELECTOR SWITCH TO THE "START" POSITION AND RELEASE IT. IT WILL SPRING RETURN TO THE "RUN" POSITION.
 - THE FEED STROKE PERIOD CYCLE AND THE NUMBER OF STROKES SET ON THE FEED RATE POT. (THE FEED RATE CAN BE DOUBLED THROUGH A TOGGLE SWITCH LOCATED ON THE PRINTED CIRCUIT BOARD.)
 - TURNING THE "STOP-START" SELECTOR SWITCH TO THE "STOP" POSITION WILL ALLOW THE PRESENT FEED STROKE CYCLE TO COMPLETE. THE PRESET MULTISTROKE PROGRESSION CYCLE RESET SIGNAL WILL NOT ACTUATE ANOTHER MULTISTROKE PROGRESSION CYCLE.
 - SLIDING THE INITIATE SWITCH TO THE "A" POSITION ALLOWS THE MULTISTROKE CONTROL TO BE ACTUATED BY THE EXTERNAL RESET SIGNAL ONLY. IF THE EXTERNAL RESET SIGNAL IS INITIATED BY EITHER THE CONSOLE PUSHBUTTON OR THE EXTERNAL RESET SIGNAL PROVIDED TO CUSTOMER, THE CONTACT POINT OF THE MULTISTROKE UNIT HAS BEEN REACHED (MAX 120 VAC).
 - NORMALLY CLOSED LIMIT SWITCH (SUPPLIED BY CUSTOMER) TO BE CONNECTED TO THE EXTERNAL EQUIPMENT TO PROVIDE A RESET SIGNAL.
 - NOTE-1 IF THE RESET SWITCH IS NORMALLY OPEN WHEN AN UNCONTROLLED START CYCLE COULD BE INITIATED, THE MULTISTROKE UNIT IS CONTROLLED BY THE PRESS OF THE "STOP-START" SELECTOR SWITCH. BEFORE THE PRESS OF THE "STOP-START" SELECTOR SWITCH, THE MULTISTROKE UNIT WILL CONTINUE CYCLING.



RAPID AIR 69100023 REV. A

ISOLATED NORMALLY OPEN CONTACT PROVIDED TO CUSTOMER. THE CONTACT POINT OF THE MULTISTROKE UNIT HAS BEEN REACHED (MAX 120 VAC)

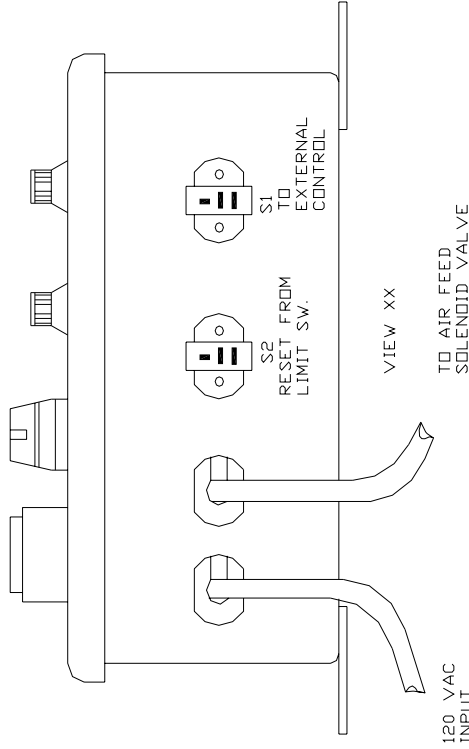
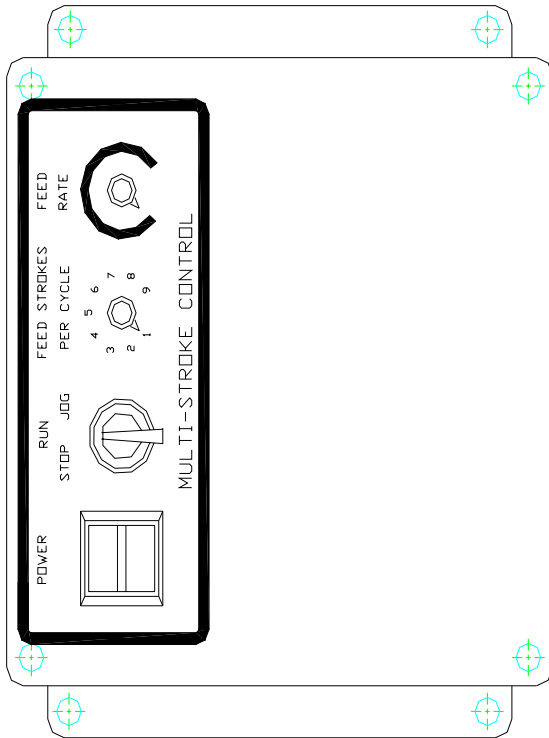
NORMALLY CLOSED LIMIT SWITCH (SUPPLIED BY CUSTOMER) TO BE CONNECTED TO THE EXTERNAL EQUIPMENT TO PROVIDE A RESET SIGNAL.

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RAPID-AIR CORPORATION
ROCKFORD, IL • MADISON, SD

ELECTRICAL DIAGRAM FOR MULTISTROKE CONTROL

PART NAME	ELECTRICAL DIAGRAM FOR MULTISTROKE CONTROL	
MATERIAL	WEIGHT	
HEAT TREAT	HARDNESS	
DRAWN BY GSM	CHECKED BY	FINAL FINISH
DATE 3-22-93	DRAWING NUMBER	
SCALE FULL	85500131	
REV.	CHANGE	



RAPID-AIR CORPORATION
 ROCKFORD, IL • MADISON, SD

PART NAME		MULTI-STROKE CONTROL	
MATERIAL	WEIGHT		
HEAT TREAT	HARDNESS		
DRAWN BY	CHECKED BY	FINAL FINISH	
DATE	DRAWING NUMBER		
SCALE	MULTI STRK	B	

Warranty

ALL SALES BY THE COMPANY ARE MADE SUBJECT TO THE FOLLOWING TERMS AND CONDITIONS. PLEASE READ.

WARRANTY - The Company warrants, for a period of one year from date of shipment by the Company, that the product shipped is free from defects in material and workmanship. THIS WARRANTY IS EXCLUDING AND IN LIEU OF ALL IMPLIED WARRANTIES IN LAW, INCLUDING MERCHANT - ABILITY. The Company obligation under this warranty is limited to repairing or replacing, F.O.B. Madison, SD, any part or parts proved to have been defective when shipped. In no event shall the Company be liable for special or consequential damages. Provisions set forth in specifications are descriptive and subject to change and are not intended as warranties.