

# **Rapid Air Corporation Operating Instructions**

## **Economy Cut To Length without Batch Control**

4601 Kishwaukee Street, Rockford, IL 61109  
815-397-2578

## **ECONOMY CUT TO LENGTH WITHOUT BATCH CONTROL**

The Cut-To-Length Control when coupled with a Rapid-Air feed and cutter assembly can be put into production with a minimum of adjustments.

The control is completely self contained and requires only 2 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 cable connection that should be connected to the solenoid of the cutter.

### **FEED SIGNAL OUTPUT:**

The feed signal output should be connected, as intended, to a Rapid-Air feed solenoid. The amperage of this output is 0.5 amp. at 120 amp. The output is labeled on the electrical enclosure to avoid any confusion when connecting the cables.

The diagram, 85500212, illustrates the proper interface connection of the switch to the controller at position (S2).

### **CUTTER SIGNAL OUTPUT:**

The cutter signal output should be connected as intended, to a Rapid-Air cutter solenoid. The amperage of this output is 0.5 AMP. at 120 VAC. The output is labeled on the electrical enclosure to avoid any confusion when connecting the cables.

The diagram 85500212, illustrates the proper interface connection of the switch to the controller 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 economy cut to length unit has (7) 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**

This potentiometer is used to synchronize the timing of the feed to the cutter. As the electrical controller is based on timing and there are numerous combinations of feeds and cutters, the potentiometer adjustment will fine tune the timing of the feed stroke to the cutter stroke.

#### **5. CUTTER DWELL POTENTIOMETER**

Due to the wide range of materials that can be used in the cutter, Rapid-Air built in a cutter forward delay through the use of a potentiometer. By tuning the potentiometer, the fastest cycle time can be achieved while still being able to cut through the material. Transversely, if a job is being run and the cutter is getting dull, the potentiometer can be adjusted to slow the cutter down to get the job finished before changing or sharpening the cutter blades.

#### **6. FEED RATE 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 too high (trying to cycle the feed at 200 SPM when the feed is only capable of 160 SPM) severe misfeeding 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,  
(listed in the Rapid-Air catalog) at the required progression.

N=The required number of feed cycles per part.

Example:

If it is desired to produce 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 20 parts per minute (PPM).

#### **7. SINGLE/BATCH CYCLE SWITCH:**

When the cycle switch is set on "SINGLE", the controller will allow (1) complete cycle and then stop. This is used for set-up purposes. When the cycle switch is set on "BATCH", the controller will cycle until the batch complete has signaled the controller to stop or the "STOP-RUN-START" selector switch is turned to stop.

## 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.

## SMALL CUTTER

### Cutter Data:

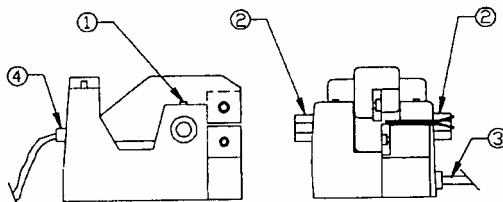
See specific cutter specifications.

### Operations:

The solenoid valve, which is remote mounted, is attached to the cutter (item #3) by a plastic hose and advances the cutter into the material. Compression springs return the blade to the raised position. The cutter raised position is monitored by a proximity switch mounted on the rear of the cutter. (item 4)

### Adjustments:

The cutter blade may be lowered manually by pushing down on the head of the cutter. The upper half of the cutter is attached to an adjustable slide. The cutter clearance can be adjusted by loosening 2 screws (item #1) and rotating the hex nuts (item #2). To adjust, loosen one side and tighten the opposite side corresponding to the side you want to adjust in order to line up the blades. Retighten the top screws (item #1). When greasing, use Mobilux No. 2 or equivalent.



## LARGE CUTTER

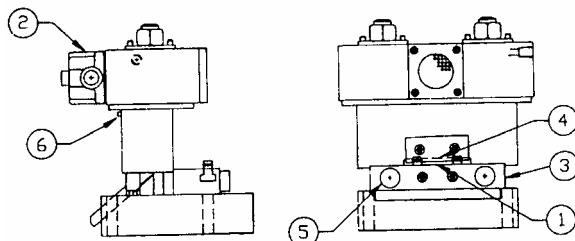
Cutter Data: Material opening item #1; See specific cutter specifications.

### Operations:

The solenoid valve (item #2) advances the cutter into the material and the compression springs return the blade to the raised position.

### Adjustments:

The blade may be lowered manually with an eccentric cam screw (item #6) located on the upper blade assembly just under the solenoid valve. The lower half of the cutter is attached to an adjustable slide (item #3). The cutter clearance is adjusted by loosening (2) hex screws (item #4) on the adjusting slides and turning (2) knurled knobs (item #5) to move the lower blade horizontally in & out.



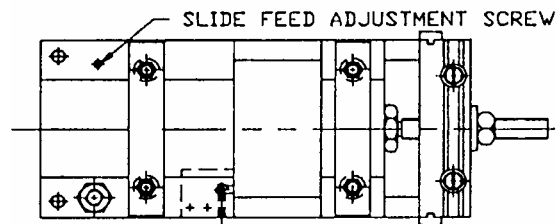
## AIR FEED PROGRESSION SET UP

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 cutter head assembly requires very little maintenance. The most important is keeping the blades clean and sharp. Each blade has 4 sharp sides on it so if the blade gets dull then rotate the blade. When all the sides have been used then the blade will need to be sharpened and the cutter might have to be reset for optimum cutting.

The air feed needs very little maintenance. The second 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 as they can loosen up over time to the vibration and high impact movement of the air feed.

## LUBRICATION

For a general guide for the cut to length, 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.

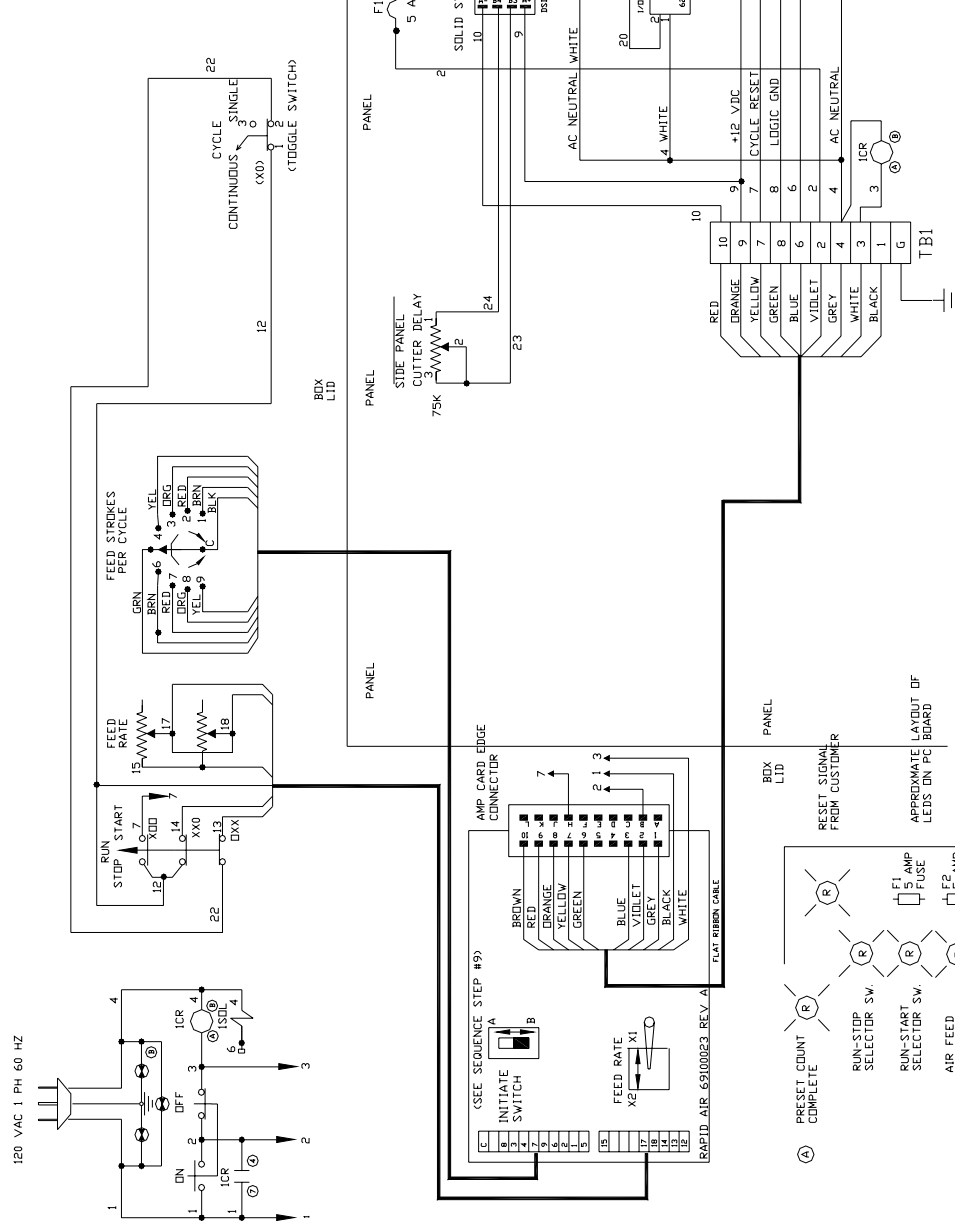
Loctite sealant is used on threaded parts type AV.

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

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.

SEQUENCE OF OPERATION

- SUPPLY 120 VAC TO MULTISTROKE UNIT THROUGH POWER CORD PROVIDED.
- PUSH GREEN "DN" PORTION OF POWER PUSHBUTTON.
- AND SELECT "START" POSITION OF ROTARY SWITCH TO THE "START" POSITION.
- THE FEED WILL BEGIN 1/2 CYCLE FOR THE NUMBER OF STROKES SET ON THE "FEED STROKES PER CYCLE" ROTARY SWITCH.
- THE FEED WILL CYCLE AT THE RATE DETERMINED BY THE SETTING ON THE "FEED RATE" POT. (THE FEED RATE CAN BE ADJUSTED THROUGH A TOGGLE SWITCH LOCATED ON THE PRINTED CIRCUIT BOARD.)
- CAUTION: TOO FAST OF A SETTING WILL CAUSE IM-PROPER FEEDING AND MISFEEDING WILL RESULT.**
- AFTER THE FEED AND OUT CYCLE IS COMPLETE THE SYSTEM WILL BE RESET BY THE "PRESET COUNT COMPLETE" SIGNAL FROM THE "DWELL" IS ADJUSTED BY THE CUTTER DELAY POTENTIOMETER.
- SINGLE CYCLE OPERATION IS SELECTABLE THROUGH A FRONT PANEL SWITCH.
- TURNING THE "START-STOP-RUN" SELECTOR SWITCH TO THE STOP POSITION WILL ALLOW THE PRESENT FEED STROKE CYCLES TO COMPLETE, THE PRESET COUNT WILL NOT ACTIVATE AND THE MULTISTROKE PROGRESSION CYCLE WILL NOT ACTIVATE AND THE MULTISTROKE PROGRESSION CYCLE.
- THE INITIATE SWITCH ON THE 6910023 ASSY. MUST BE SET TO THE "B" POSITION ONLY.



**RAPID-AIR CORPORATION**  
 ROCKFORD, ILL. MADISON, SD

PART NAME: ECCN. CUT-TO-LENGTH SCHEMATIC

ASST.	STANDARD W/G TOLERANCES UNLESS OTHERWISE SPECIFIED	MATERIAL	WEIGHT
DRIVE SHAFT	± 0.030	HEAT TREAT	
DRIVE PULLEY	± 0.005		HARDNESS
THROTTLE PLATE	0		FINAL FINISH
THROTTLE PLATE	0.005	DRAWN BY KJL	CHECKED BY
FEED PLATE	0.005	DATE 4MAY93	DRAWING NUMBER
FRACTIONS	1/64	SCALE FULL	85500212
		REV.	DATE
		CHANGE	



## **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.