

# **Rapid Air Operating Instructions**

## **MSA2 MINI-SERVO FEED**

3-04

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## INTRODUCTION

The MSA2 servo has many features found in the more expensive models. Some of its features are:

**Input:** 120 VAC, 50/60 HZ

**Amperage required at input:** 10 amps maximum.

**Accuracy:** .0025 per feed length at the rolls.

**Maximum feed length input:** 999.999 inches.

**Job storage:** 99 jobs

**Display:** 4 rows by 80 characters, backlit

**Fault type:** Displayed on the drive if a fault occurs otherwise an "8." is displayed.

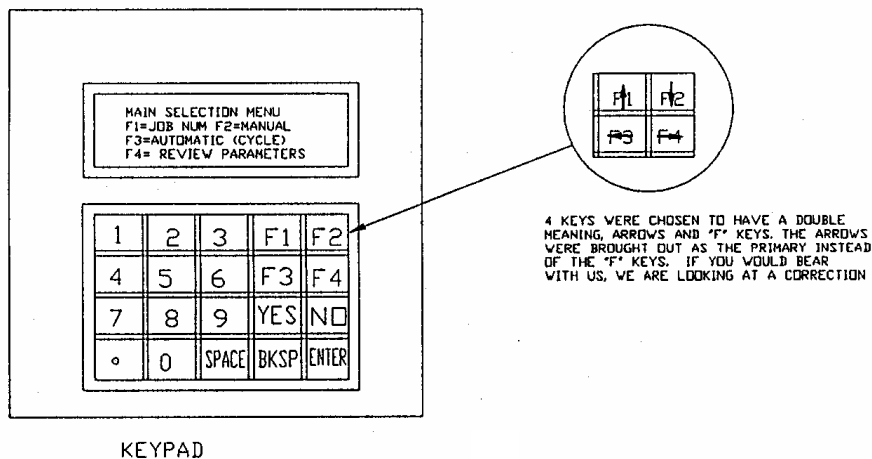
**Rolls:** Hardened and Ground

**Drive roll parallelism adjustment:** Used to tune the rolls to the material if needed.

The Rapid Air MSA2 feed uses the same type of programming procedures as it has in its more expensive models. Input a feed length, strokes per minute, and a feed arc and the program will adjust the servo acceleration/deceleration and maximum servo speed parameters to the requirement needed to keep up to the press strokes per minute.

The precision mechanical roll feed has been designed for compactness, ease of setup and installation. A 120 VAC. receptacle is all that is required of the customer. Two cables are supplied with the control and need to be connected to the proper locations of the motor. The electrical controls are housed in a small box that can be mounted on the press or if purchased, on a post that can be positioned close to the press.

### Note:



## **INSTALLATION**

The Rapid Air servo was run and fully tested before being shipped from our plant. Carefully inspect all parts when uncrating them. If you find any damaged parts, please report it to the carrier that delivered the servo drive and at the same time, report the damage to your distributor.

The servo feed container should contain:

1 servo feed-- standard

1 console-- standard

1 console stand-- optional

1 servo mounting bracket-- optional

1 cascade roller assembly-- optional

Please contact someone at your facility to verify what options were purchased.

If a mounting bracket was purchased then it should be mounted first being careful that the center line of the bracket lines up with the centerline of the die area. The servo can then be mounted on the bracket. A print of the bracket can be found in the back of this manual.

If a bracket was not purchased then the servo will have to be mounted on the press bed or customer provided bracket. Line up the rolls to be centered and perpendicular to the center line of the die area. Included in the back of this manual is a hole pattern layout print for the MSA2 servo.

## **ROLL PRESSURE**

The roll pressure knob is located on the entrance side of the feed and is a knurled knob with a locking nut located right behind it. It is positioned parallel to the inlet face and uses a compression spring for adjusting roll pressure.

## **ROLL RELEASE HANDLE**

The roll release handle is located on the right side of the feed if viewed from the entrance end. Lifting the handle opens the rolls and lifting to it's stop will lock the rolls in place. This is a true statement if the pilot release stop is not set. If the stop is set then the roll will only raise until the stop is reached just like in automatic for pilot release.

## **ELECTRIC PILOT RELEASE**

The optional electric pilot release can be mounted on the entrance side of the servo at the place labeled "inlet". It is the customer's responsibility to interface the pilot release valve with the customer supplied, press mounted, activating switch. The air requirements for the release to work correctly is 80 to 120 PSI, dry filtered and lightly lubricated air. There should be a minimum of 2 CFM available at all times.

## **PILOT RELEASE STOP**

The pilot release stop is mounted next to the roll pressure knob and should be set to let the rolls open about .020 or so to free the material during piloting.

## **GEAR BOX**

The gear box is located within the feed body on the same side as the roll release handle. It has a non-lubricated gear box so it is essentially maintenance free.

## **FEED ROLLS**

The rolls are case hardened and ground solid rolls which make them good for profiling, if you are running a part that would need clearances ground into the roll. Useful information that you might need in the future is that one revolution of the rolls is 3.173 inches. This can be used to check if the program and motor are working correctly. Put a line on the lower roll and program the feed to feed 3.173 inches. The line should return to the same spot after every feed. If it does not then call Rapid Air. If it does then something in the setup such as roll pressure or an obstruction is not die could cause a short feed.

## **ADJUSTABLE ENTRANCE GUIDE**

The adjustable entrance guide is an add on feature that can and should be used on the entrance and exit of the servo feed. It has screwdriver slotted adjustable stops for quick stop adjustment. By having one on each end of the feed, the set up time for aligning the material in the feed is decreased considerably as you will now know that the material is straight through the feed before entering the die.

## OPERATOR INPUT SECTION

The intent of this section is to familiarize the operator with the flow of the program and what to expect with each key press. Each program screen of the servo will be displayed and also comments to clarify possible questions. There are four sections that will be explained and they are as follows

### SECTION 1- JOB NUMBER

### SECTION 2 - MANUAL MODE

### SECTION 3 - AUTOMATIC MODE

### SECTION 4 - REVIEW PARAMETERS

When the servo is first started, and has performed it's startup procedure, the first screen displayed should look like this.

```
-----  
| MAIN SELECTION MENU:           |  
| F1=JOB NUM F2=MANUAL          |  
| F3=AUTOMATIC (CYCLE)         |  
| F4=REVIEW PARAMETERS         |  
-----  
* SELECT F1=JOB NUM
```

The first step in programming a job is to select a two digit job number which will be used to store the parameters that the operator inputs or to recall an existing job number that was previously loaded. When the operator presses F1 on the keypad, the screen will change to:

```
-----  
| JOB SELECTION MENU            |  
| ENTER JOB NUMBER = _____|  
| PRESS F4 KEY AFTER           |  
| CORRECT # IS ENTERED        |  
-----
```

The next screen lets you program parameters or exit with the existing parameters.

```
-----  
| JOB NUMBER = _____      |  
| F1=PROG. PARAMETERS         |  
| F4=DON'T ALTER VALUES     |  
|                               |  
-----
```

Pressing the “F1 PROG. PARAMETERS” key initiates the following screen. Key in the required parameters.

```
-----  
| FEED LENGTH= _____ |  
| PRESS SPEED= _____ |  
| FEED ANGLE= _____ |  
| _____ |  
-----
```

\* ONCE THE PARAMETERS HAVE BEEN ENTERED, THE PROGRAM WILL COMPLETE THE MATH ROUTINE WHICH SELECTS THE PROPER ACCEL/DECELL AND MOTOR SPEED FOR THE PARAMETERS LISTED AND THEN THE MAIN MENU IS DISPLAYED AGAIN.

\*SELECT F2 MANUAL

If the operator elects to move the material from the feed to the die electrically, the manual mode has to be selected. Pressing the F2 key will bring up the manual mode screen.

```
-----  
| MANUAL LENGTH= _____ |  
| F1= SINGLE_FEED |  
| F2=GO TO INCH MODE |  
| F4= RETURN |  
-----
```

Each time the F1 key is pressed, the servo will move the material the feed length entered for the job number. The material will move at the speed required to keep up with the programmed press strokes per minute.

If the operator would like the material to move a slower rate then the inch mode should be selected. Press F2 now to display the inch mode screen.

```
-----  
| INCH MODE: |  
| F1= JOG FORWARD |  
| F2= JOG REVERSE |  
| F4= RETURN |  
-----
```

When the F1 key is pressed, the feed will advance the material at a slow rate of speed. When the F2 key is pressed, the feed will reverse the material and run at a slow rate of speed. Press F4 to return to the main screen.

With the main menu displayed and Pressing the “F3 AUTOMATIC (CYCLE)”, the following screen appears.

```
-----  
| AUTOMATIC JOB=01 |  
| FEED LENGTH=_____ |  
| PRESS SPEED=_____ |  
| F4= RETURN |  
-----
```

In the automatic mode, the feed length and operator entered press speed will be displayed. Whenever the press mounted feed switch is activated, the servo will feed the feed length displayed on the screen. Because there is not an interface in the control for the pilot release it will be up to the customer to wire the pilot release switch to the solenoid that operates the raising of the rolls.

Press F4 button to return to the main menu and deactivate the automatic control.

Press F4 again and the final mode is review parameters, the parameters for the job number will then be displayed.

The last function on the keypad is the “RESET JOB PARAMETERS”. This function should be used with special caution as all the jobs being used will reset to the default parameters and cannot be restored without keying each job number’s parameters.

The following screen is displayed when the period is pressed while the “Main Selection menu” is displayed.

```
-----  
| RESET JOB PARAMETERS |  
| TO DEFAULT VALUE |  
| F1= RESET VALUES |  
| F4= RETURN -DONT RESET |  
-----
```

It is very important that the operator make a hard copy of the jobs on a sheet of paper so there is a permanent record.

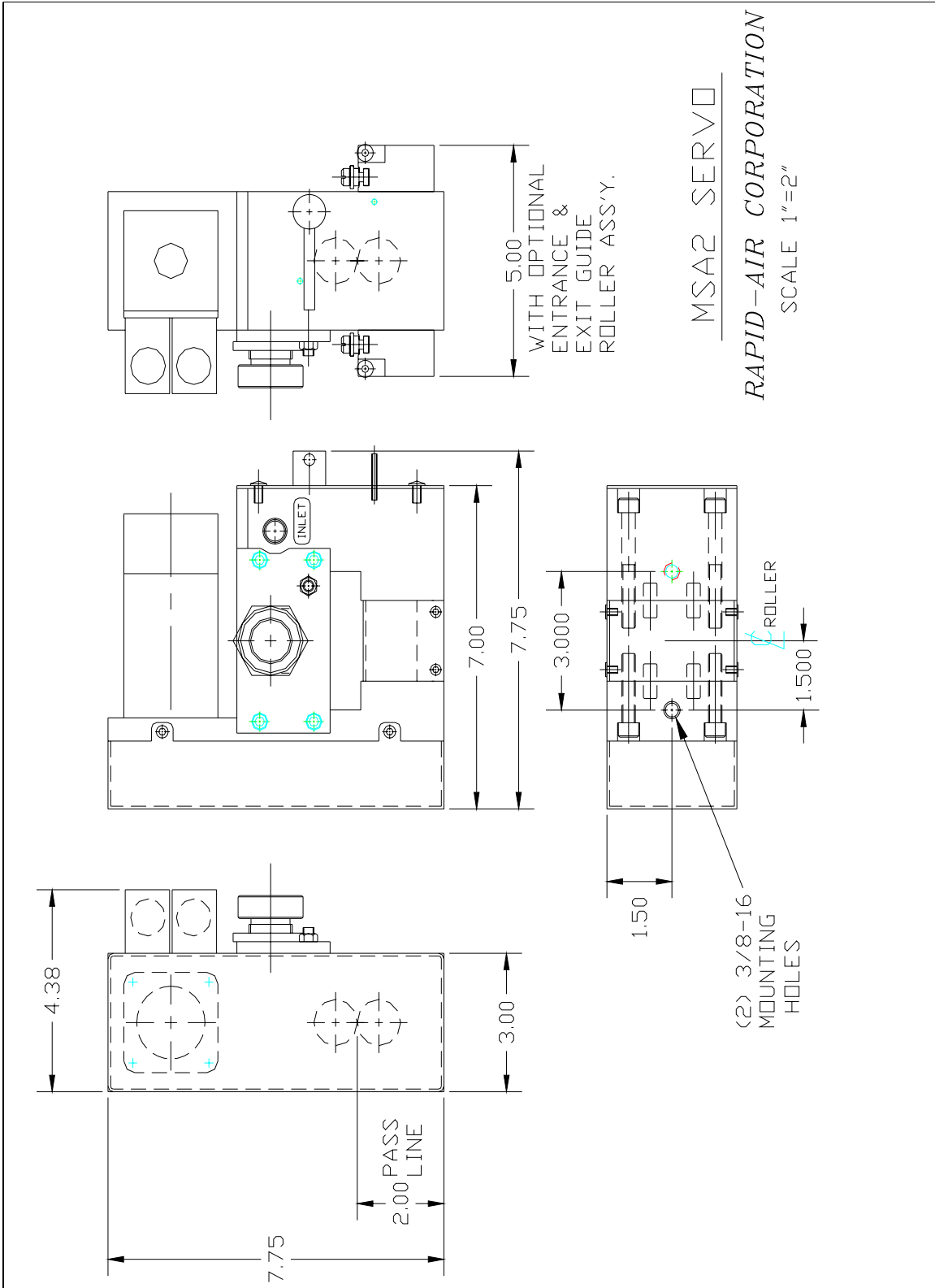
### 7.3.1 FATAL FAULT ERROR CODES

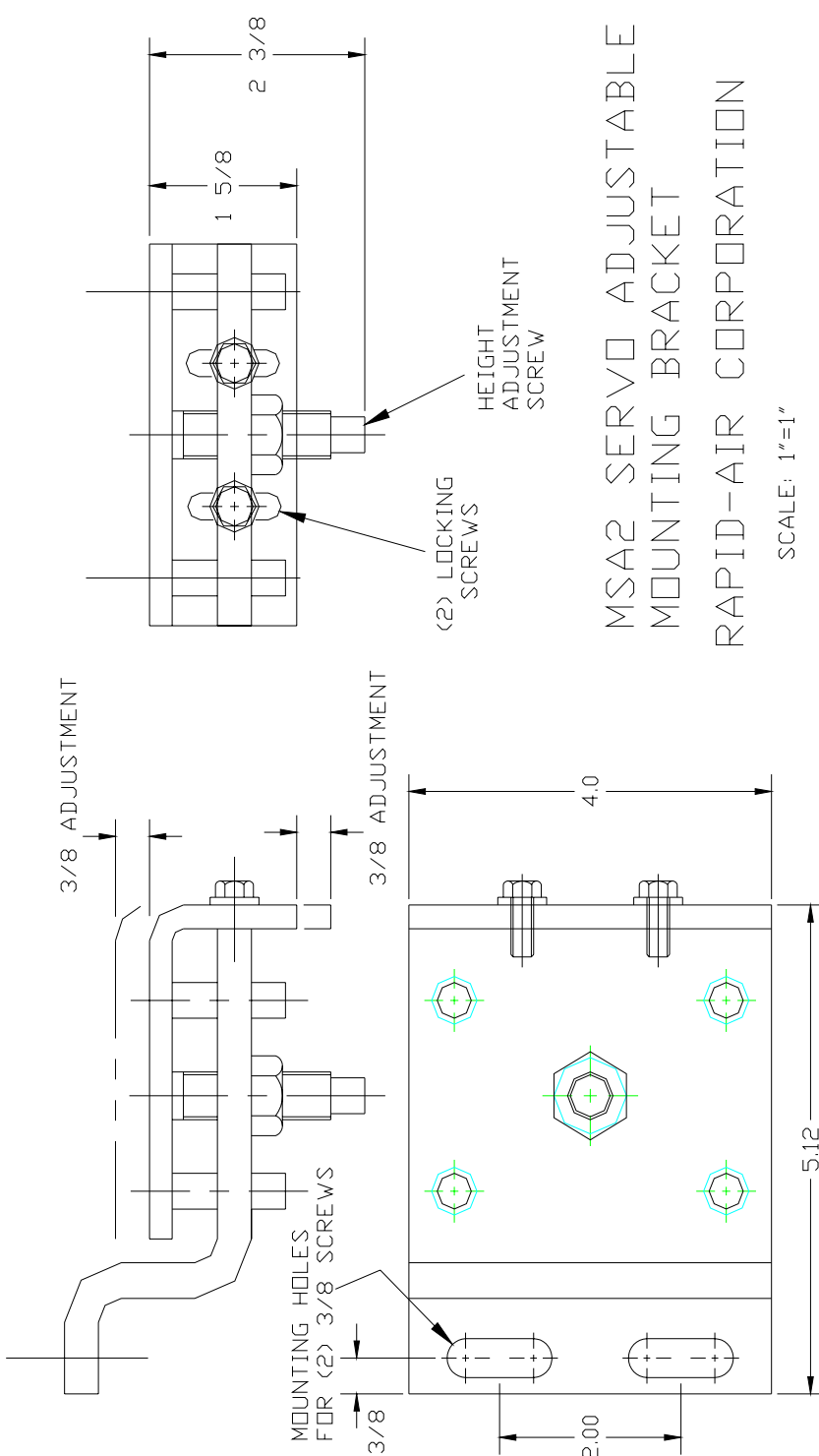
Err #	Status Display	Fault Message	Possible Cause
1	t	Power stage OverTemp	overload, fan malfunction, power stage failure
2	o	OverVoltage	excessive decel rate*
3	P	OverCurrent	power stage surge current*
4.0	r0	External feedback fault	Feedback signal through C8 not correctly detected
4.1	r1	Resolver line break	break in resolver feedback detected
4.2	r2	RDC error	fault in resolver-to-digital converted detected
4.3	r3	Sine Encoder init fail	sine encoder card has not initialized properly
4.4	r4	A/B line break	break in encoder A/B input lines detected
4.5	r5	Index line break	break in encoder index line
4.6	r6	Illegal halls	illegal hall combination detected
4.7	r7	C/D line break	break in sine encoder C/D line detected
4.8	r8	A/B out of range	sine encoder A/B level out of range
4.9	r9	Burst pulse overflow	sine encoder fault
5	u	Under voltage	bus voltage is too low
6	H	Motor over temperature	motor overload caused overheating
7.1	A1	Positive analog supply fail	Failure in +12V supply
7.2	A2	Negative analog supply fail	Failure in -12V supply
8	J	OverSpeed	velocity $\geq$ VOSPD
8.1	J1	OverSpeed	Velocity $\geq$ 1.8 x VLIM
9	E	EEPROM failure	Faulty EEPROM
10	e	EEPROM checksum fail	EEPROM checksum invalid on power up*
12	F	Foldback	System in FoldBack mode
14.1	d5	Positive over travel fault	PFB exceeded PMAX with PLIM=1
14.2	d6	Negative over travel fault	PFB exceeded PMIN with PLIM=1
15.1	d1	Numeric position deviation	Internal fault
15.2	d2	Excessive position deviation	PE > PEMAX
16	c	Communication interface	A communications fault has occurred

\*These faults can only be cleared by cycling power

### 7.3.3 NO MESSAGE FAULTS

Fault Description	Fatal	Non-Fatal	Flashing Status Display	Steady Status Display
Watchdog (DSP)	X		■	
Watchdog (HPC)	X			■
No Compensation	X		-1	
Invalid Velocity Control	X		-2	
Encoder not Initialized on attempt to enable	X		-3	
Encoder Initialization failure	X		-4	
AutoConfig failure	X		-5	
Hardware CW limit switch open		X	L1	
Hardware CCW limit switch open		X	L2	
Hardware CW and CCW limit switches open		X	L3	
Software CW limit switch is tripped (PFB > PMAX & PLIM=2)		X	L4	
Software CCW limit switch is tripped (PFB < PMIN & PLIM=2)		X	L5	
Positive and negative analog supply fail	X		A3	
RAM failure (during init)	X			I
EPROM checksum (during init)	X			c
Altera load failure (during init)			E101	
Altera DPRAM failure (during init)			E102	





MSA2 SERVO ADJUSTABLE  
MOUNTING BRACKET

RAPID-AIR CORPORATION

SCALE: 1"=1"



