

Installation and Operation Manual

MINI

SERVO ROLL FEED

Models SRF-105M through SRF-320



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RECEIVING INSPECTION

Before removing unit from its packaging, check for visual damage, especially if crate, skid, or carton has been damaged in transit. Any damage caused by shipping should be immediately reported to the carrier. If unit appears in satisfactory condition, remove all packing and wipe rust preventive from rollers with mild solvent.

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1. INTRODUCTION

The P/A Industries Mini Servo Roll Feed is a state of the art AC Servo feed, which eases operator adjustments to feed pitch, speed, and acceleration. These operator adjustments are entered into the control memory by keypad input. With the use of a positional limit switch, the press signals the feeder when to begin moving the strip. The operating speed of the press should be set to provide adequate time for the index to be completed while the die is open.

The mechanical simplicity, accuracy, and ease of use of the Mini Servo Roll Feed should help to improve your quality and production for years to come.

2. HOW A SERVO FEED OPERATES

The Mini Servo Roll Feed consists of:

- 1) Mechanical assembly
- 2) Servomotor
- 3) Servo Control

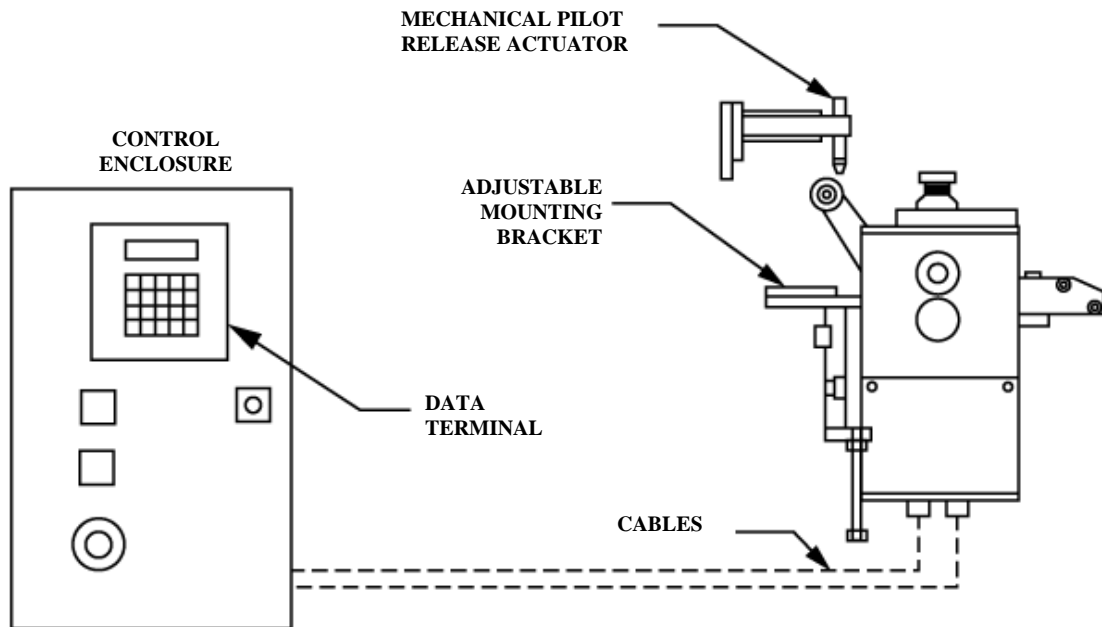


Figure 1

The servo control acts as the central processor for the Mini Servo Roll Feed. Feed parameters entered into the servo control are processed to position the servomotor. Calibration of the motor encoder to the feed roll circumference allows accurate positioning of the feed roll. Each revolution of the servomotor produces 8000 encoder pulses. Every 2.857 revolutions of the servo motor shaft produce 1 revolution of the feed rollers. The circumference of the lower roll is approximately 5.566 inches.

When a new feed pitch is entered into the system, the built-in computer calculates the correct number of electronic "pulses" it must receive from the motor mounted encoder in order to rotate the feed rolls the correct distance.

Example: If a feed pitch/length of 5.566 inches is entered into the feeder, this will result in exactly one revolution of the feed rolls. The motor will accelerate and turn 2.857 turns. This will produce $(2.857 \times 8000 = 22,856)$ pulses of the encoder. The feeder will decelerate and stop when 22,856 pulses are detected. The feeder is now on position. The

end result is an accurately positioned strip exactly 5.566 inches from its starting point. This entire process happens in milliseconds.

3.INSTALLING YOUR “MINI” SERVO FEED

3.1 MECHANICAL INSTALLATION

The Mini Servo Roll Feed is supplied with an adjustable mounting bracket. The feed should be securely mounted to the press frame. (A transition bracket is sometimes required in certain applications.) The feed should be centered, square, and perpendicular to the pass line of the press. It should be mounted at a height that will accommodate the appropriate die sets. The feed has a pass line height adjustment of ± 1.2 inches (Note: The centerline of the Feeder is NOT the centerline of the rolls.) Refer to Figure 2 on Page 4 for dimensioning.

The feeder may be used to push or pull strip stock through the die.

If pilot locating pins are used in your die sets, the optional mechanical roll release bracket should be attached to the press ram. It must be mounted in such a way as to provide roll release at the proper time and be adjustable for different die sets.

If the optional electro-pneumatic piloting is used, another cam switch will be necessary for controlling feed roll opening and closing.

3.2 ELECTRICAL INSTALLATION

The Mini Servo Roll Feed has been designed to make electrical connections quickly and easily. Simply connect the power plug to a "clean" 115 VAC, single phase, 10-Ampere source (15-Ampere for SRF-320 model). Avoid having other equipment share the same circuit as the feeder. The inputs and outputs to your press control (i.e. Emergency Stop, Feed Cam Contact, Pilot Release Cam Contact) must also be connected for proper operation. The motor connects by factory installed "Amphenol" (Military Specifications) Quick connectors.

3.3 ELECTRICAL CONNECTIONS

For more detailed wiring information refer to Electrical Schematic A-17647-11.

NOTE:

All connections should be made in accordance with National Electrical Code (NEC) requirements and must comply with all local ordinances.

NOTE:

A word about electrical “noise”. Most pressroom environments contain considerable electrical noise. It is emitted from electro-mechanical press relays, contacts, and solenoids. While the Mini Servo Roll Feed has been designed to minimize “self generated” electrical noise, it is difficult to provide protection for all applications. If erratic system behavior is experienced, then the source of the “noise” must be suppressed with either a resistive/capacitive type of suppressor on AC coils, or “Avalanche” type diodes on DC coils.

NOTE:

The Mini Servo Roll Feed is fully protected by line circuit breakers. If it becomes necessary to replace the fuses, use only exact equivalent fuse types to prevent serious damage to the system.

NOTE:

The electrical control enclosure is supplied with a stand-support, which may be placed in any convenient location. The enclosure may also be mounted in any fixed location as long as the cabling is adequate to reach the feed. It is not recommended that the electrical enclosure be mounted directly to the press. The vibrations caused by the punch press can result in damage to the control system.

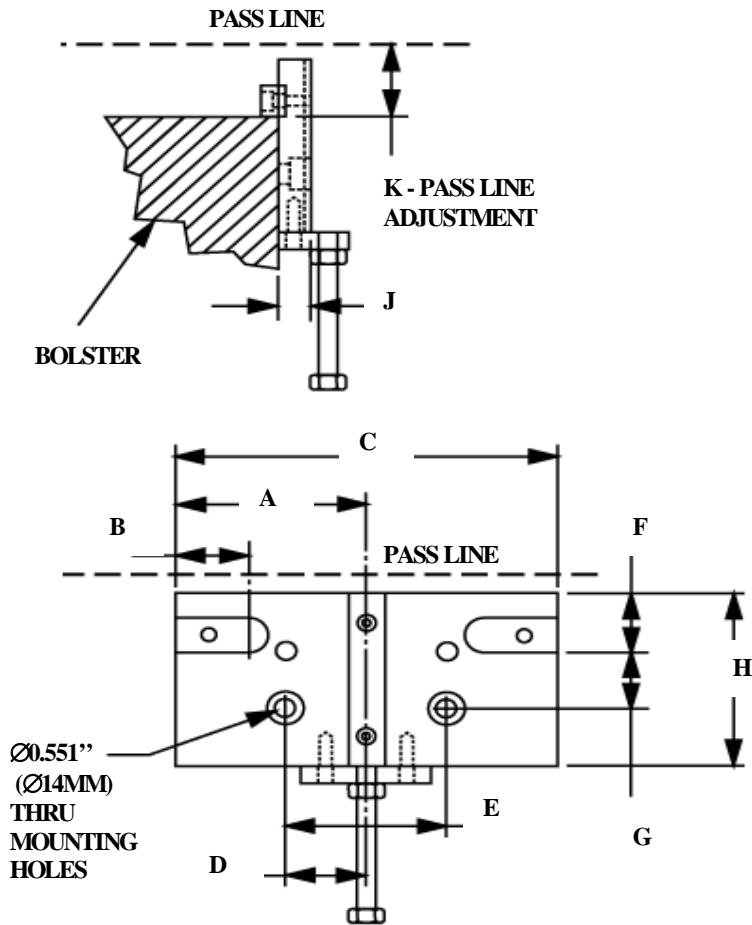


Figure 2

DIMENSION	MOUNTING DIMENSIONS					
	SRF-105M		SRF220M		SRF-320M	
	INCHES	MILLIMETERS	INCHES	MILLIMETERS	INCHES	MILLIMETERS
A	4.63	117.50	6.89	175.00	8.86	225.00
B	1.77	45.00	1.77	45.00	1.77	45.00
C	9.25	235.00	13.78	350.00	17.72	450.00
D	1.97	50.00	3.94	100.00	3.94	100.00
E	3.94	100.00	7.87	200.00	7.87	200.00
F	1.58	40.00	1.58	40.00	1.58	40.00
G	1.58	40.00	1.58	40.00	1.57	40.00
H	4.72	120.00	4.72	120.00	4.72	120.00
J	0.79	20.00	0.79	20.00	0.79	20.00
K - PASS LINE ADJUSTMENT	MAX 4.37	MAX 111	MAX 4.37	MAX 111	MAX 4.37	MAX 111
	MIN 2.01	MIN 51	MIN 2.01	MIN 51	MIN 2.01	MIN 51

4. PROGRAMMING THE “MINI”

IMPORTANT!

Before turning the system on for the first time, verify that the main input voltage is correct (115 VAC single phase) and inspect all connections for tightness, shorts, etc.

Plug the 115 VAC plug into a clean 10 Amp supply (15 Amp for SRF-320 model. Press the amber ‘POWER ON’ push button. The button will illuminate and the data input display will be visible. If pressing the ‘POWER ON’ push button has no effect, then check the ‘TWIST-TO-UNLOCK’ Emergency Stop button for the ‘UP’ or ‘RELEASED’ position.

Start up screen is displayed for about 5 seconds.

```
P/A Industries Inc
      MINI
  Servo Roll Feed
V2.1 Copyright 2004
```

Provided no fault is present, the following screens will appear sequentially:

```
Checking
servo drive
```

```
No faults found!
```

```
Communications
with servo drive
established
```

In case of a fault condition present in the servo drive, the following flashing screen will display all present faults by their numbers. Fault numbers and their descriptions are listed in the fault table on page 13 of this manual.

```
Fault code: 30
```

```
See fault code table
```

Any fault problem must be solved before further operating.

Normally, there are no faults and the keypad reads values of Length, Speed and Accel, stored in the servo drive.

```
Getting Length
```

```
Getting Speed
```

```
Getting Accel
```

At this point a servo feed ready for normal operation.

Units of measure are displayed in inches or meters/millimeters, depending on the value of the scale parameter. Standard Scale values are: 4106.7 counts/inch and 161.7 counts/mm.

```
1 Length:2.54      in
2 Speed:100       in/s
3 Accel:400      in/s^2
Enter choice:
```

```
1 Length:25.4     mm
2 Speed:2.5       m/s
3 Accel:10        m/s^2
Enter choice:
```

To Change:

- > Length press '1' then 'ENTER'
- > Speed press '2' then 'ENTER'
- > Accel press '3' then 'ENTER'

4.1 ENTER FEED LENGTH

Enter in '1' and press 'ENTER'.

```
1 Length:2.54      in
2 Speed:100       in/s
3 Accel:400      in/s^2
Enter choice:
```

Enter in the new feed Length and press 'ENTER' or to cancel, press 'ENTER' (leave the Length field blank).

```
Length:2.54      in
New Length:
Press ENTER to exit
```

```
Length:2.54      in
New Length:3.00
Press ENTER to exit
```

```

Length:3.00      in
New Length:
Press ENTER to exit

```

To exit, press 'ENTER' (leave the Length field blank).

```

1 Length:3.00      in
2 Speed:100.00    in/s
3 Accel:400.0    in/s^2
Enter choice:

```

The maximum feed Length that may be entered is 999999 inch or mm.

4.2 ENTER FEED SPEED

Enter in '2' and press 'ENTER'

```

1 Length:3.00      in
2 Speed:100.00    in/s
3 Accel:400.0    in/s^2
Enter choice:

```

Enter in the new Speed and 'ENTER' or to cancel, press 'ENTER' (leave the Speed field blank).

```

Speed:100.00      in/s
New Speed:
Press ENTER to exit

```

```

Speed:100.00      in/s
New Speed:120
Press ENTER to exit

```

```

Speed:120.00      in/s
New Speed:
Press ENTER to exit

```

To exit, press 'ENTER' (leave the Speed field blank).

```

1 Length:3.00      in
2 Speed:120.00    in/s
3 Accel:400.0    in/s^2
Enter choice:

```

The maximum Speed that may be entered is 160 in/sec or 4 m/sec.

4.3 ENTER FEED ACCEL

Enter in '3' and press 'ENTER'

```

1 Length:3.00      in
2 Speed:120.00    in/s
3 Accel:400.0    in/s^2
Enter choice:3

```



```

Accel:400.0    in/s^2
New Accel:
Press ENTER to exit

```

Enter in the new Accel and press 'ENTER' or to cancel, press 'ENTER' (leave the Accel field blank).

```

Accel:400.0
New Accel:600
Press ENTER to exit

```

```

Accel:600.0    in/s^2
New Accel:
Press ENTER to exit

```

To exit, press 'ENTER' (leave the Accel field blank).

```

1 Length:3.00    in
2 Speed:120.00  in/s
3 Accel:600.0   in/s^2
Enter choice:

```

The maximum Accel that may be entered is 1200 in/sec² or 30 m/sec².

4.4 SET-UP PARAMETERS

The set-up parameters are set at P/A Industries factory and normally don't need adjustment. To access these parameters:

Press '99' then 'ENTER' to check servo drive fault status.

Press '100' then 'ENTER' for Jog Speed.

Press '102' then 'ENTER' for KP Gain.

Press '103' then 'ENTER' for Scale Factor.

Press '104' then 'ENTER' for Direction.

Press '105' then 'ENTER' for Dwell.

Press '106' then 'ENTER' for Kff gain.

Press '107' then 'ENTER' for P gain.

Press '108' then 'ENTER' for I gain.

Press '109' then 'ENTER' to reset faults.

NOTE:

Before changing the "Direction" parameter, the servo drive must be disabled by pressing and holding "Power On/Reset" button.

5. OPERATING THE FEED

NOTE:

It is very important to remember that the motor on The Mini Servo Roll Feed System is only for feeding material. It is not intended to be the power source for a pull-through straightening device, or the like. An adequate free loop must be provided at all times. This will assure consistent and accurate feeding.

5.1 LOADING THE FEED

The material should be brought from the powered pay off device to the feeder. The rolls of the feed must now be opened to accept the material. This is done by roll release lever to lift the upper roll. The maximum thickness capability of the Mini Servo Roll Feed is .062 inches. Do not try to operate the feeder with material that is thicker than it was designed to feed. Damage to the feeder may result.

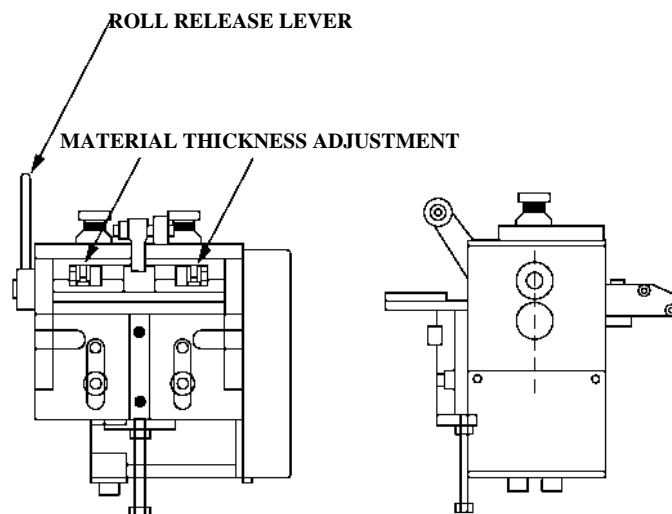


Figure 3

With the material inserted into the feed rolls and the upper roll resting on the material, the two socket head thickness screws should be adjusted to provide minimum “play” in the pilot release actuator arm. Tighten the lock nuts.

We presume that the feed system has been programmed with the proper Length, Speed, and Accel for the first die set. Also, that the press has been adjusted for the current job (i.e. shut height, tonnage monitors, lubrication, speed, etc.).

The material should be jogged into position at the die set (first station on a progressive type die). Check the “free running” of the strip in the die.

If possible, put the strip through the entire die set, open the rolls, and make sure the material slides easily in the die set. Once the material is aligned square into the die, then the guide rollers on the inlet of the feeder must be adjusted. These rollers should be locked into position with approximately .010 inch gap between the edge of the strip and the roller. If the rollers are set tightly against the strip, then servo drive overloads could result.

5.2 AUTO/MANUAL MODE

When ‘MANUAL’ is selected via the 2-position selector switch, the control is put into ‘MANUAL MODE’. During manual mode the feeder may be jogged infinitely in either direction.

Pressing ‘Cycle Start’ button, while the 2-position selector switch is in ‘AUTO MODE’ makes a servo feed ready to accept an index signal from the press.

NOTES ABOUT "POSSIBLE PROBLEM TOOLING"

- A tight die, one that is not square, or has other tooling problems, will cause significant difficulty and downtime. Accuracy in feeding is directly related to how easily the feeder can position the strip in the die. Binding, bad part ejection, or sticking parts may cause the material to "jam" in the die.
- The Mini Servo Roll Feed will "try" to overcome the "jam-up" by applying more power to the rolls.

ONE OF THREE OUTCOMES WILL RESULT:

- The feed will apply more power to the rolls causing them to slip on the material. This produces a "short-feed". In reality, the feeder did not "misfeed". The rolls positioned properly; the strip just did not keep up. The die then closes producing a miss-hit.
- The feed applies more power to a thin strip causing the material to buckle somewhere between the feed and the die set. The feeder positioned the strip accurately, it just did not occur in the die set.
- The feed tries to apply so much power to a heavy strip in order to move it, that excessive current is drawn by the servo drive. This results in the drive shutting itself down to protect itself.

The press ram should now be "inched" down until the pilot pin is located just above the prepunched strip. The mechanical pilot actuator on the feed should now be adjusted to open the rolls just after the pin is into the strip. (See Figure 4.)

The ram can now be inched thru the bottom of the stroke and carefully inched up until the pilot pin or longest punch is just clear of the strip.

Now look at the entire die set and see that it is "safe" to move the strip. If so, now is the time to set the 'Feed Index Cam'.

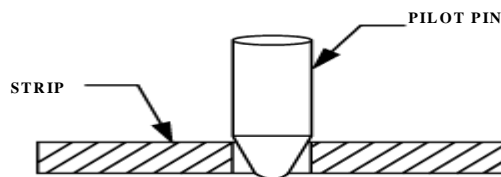


Figure 4

NOTE ABOUT CAMS:

The Feed Index Cam (open tool): The feed system uses this press cam for timing the feeder to the press crankshaft. Although no shafting or belts actually connect the press to the feeder, the feed must be "told" when it is safe to move the strip.

- This "connection" is an electrical one, and not a mechanical one. This gives the operator/set-up personnel total flexibility in deciding when the feed progression should take place.
- Each die set can have a unique 'Feed Angle'. This 'Feed Angle' is dependent upon many variables; pilot and punch length, press stroke, strip forming in the die, etc.

5.3 FEED INDEX SIGNAL

The Mini Servo Roll Feed requires one signal to control the feed indexing. This signal initiates the start of feeding, and is usually set to occur as soon as the die is open. The duration of the feed signal should be at least 30 milliseconds (ms). The feed signal should be 'OFF' at the top of the press stroke to prevent double feed indexes. (See Figure 5.)

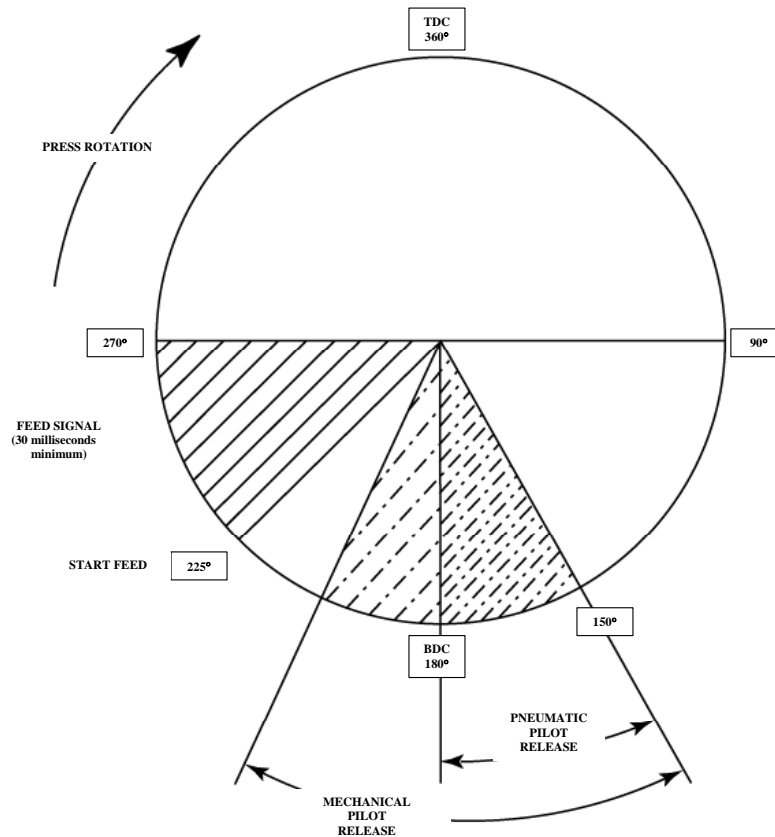
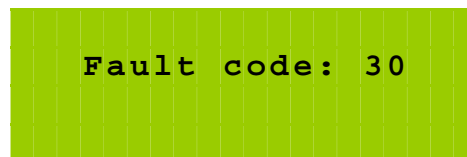


Figure 5

5.4 CONTROL FAULT CONDITIONS

If a Fault Condition exists on power up, the display will be similar to the one shown below.



If a Fault Condition happens while the feed is running (the 'DRIVE READY' indicator goes off), enter "99" into the keypad, and then press "ENTER" key to display the drive Fault Numbers. Refer to the Fault Number table (page 13) to determine the drive's fault. Enter "109" into keypad, and then press 'ENTER' key to reset faults.

5.5 SERVO DRIVE FAULT TABLE

Fault Number	Fault Name	Fault Description	Possible Cause(s)	Suggested Action
1	Non-Volatile Memory Endurance Exceeded	A section of non-volatile memory is used to assist in tracking absolute position when the drive is connected to a motor with absolute feedback. This fault occurs when the total number of memory writes to this area exceeds the maximum value allowed.	Range of motion and number of home position definitions during the product life exceeds the maximum allowed.	This is an unrecoverable fault, the drive must be sent back to the factory
2	Position Change Exceeds Position Rollover	This fault is generated if the change in position command or position feedback exceeds half the machine cycle size during a position loop update. This effectively limits the velocity to half the machine cycle size per millisecond.	The velocity command or feedback exceeds half the machine cycle length per millisecond.	Increase machine cycle size or reduce velocity profile. Note: This error only applies to firmware versions prior to 1.10.
3	Absolute Feedback Range Exceeded	This fault is generated if the motor position exceeds +/- 2047 revolutions from the home position, but can only be generated in firmware versions 1.00 and 1.02.	The motor position exceeds +/- 2047 revolutions from the home position.	Decrease application range of motion. Upgrade firmware.
4	Motor Overtemperature	ON indicates the motor thermostat has tripped.	Motor thermostat trips due to high motor ambient temperature and/or excessive current. Motor wiring error Incorrect motor selection	Operate within (not above) the continuous torque rating for the ambient temperature (40°C maximum). Lower ambient temperature, increase motor cooling. Check motor wiring. Verify the proper motor has been selected.
5	IPM Fault	ON indicates that a fault was detected in the Integrated Power Module which resides in the Ultra3000 drive.	Motor cables shorted. Motor winding shorted internally. Ultra3000 temperature too high. Operation above continuous power rating.	Disconnect motor power cables from the drive. If faults stop, then either replace cable or try to find the short. Verify by disconnecting motor from drive and then try to turn by hand. If difficult to turn by hand, the motor needs to be repaired or replaced. Check for clogged vents or defective fan. Ensure cooling is not restricted by insufficient space around the unit. Verify ambient temperature is not too high. Operate within

			Ultra3000 has a bad IPM output, short circuit, or overcurrent,	<p>the continuous power rating. Increase Motion Time or allow dwell periods. Reduce acceleration rates.</p> <p>Remove all power and motor connections, and then check continuity from the DC bus to U, V, and W outputs. If continuity exists, check for conductive materials between terminals. Replace the Ultra3000 drive.</p>
6	SERCOS overtravel	ON indicates the SERCOS Limit indicator is lit.	Dedicated overtravel input is inactive.	Troubleshoot SERCOS by checking wiring and verifying motion profile
7	Encoder channel line B break	ON indicates a wiring error with channel line B.	Motor wiring error.	Check motor encoder channel line B wiring.
8	Encoder channel line A break	ON indicates a wiring error with channel line A.	Motor wiring error.	Check motor encoder channel line A wiring.
9	Bus Undervoltage	ON indicates the DC Bus is below normal operating voltage.	Low AC line/AC power input. 100 VAC minimum for safe Ultra3000 operation.	<p>Verify voltage level of the DC Bus. The Bus should be 1.414*VAC level.</p> <p>Check AC power source for glitches or line drop.</p> <p>Install an uninterruptible power supply (UPS) on your AC input.</p>
10	Bus Overvoltage	ON indicates the DC Bus is above normal operating voltage.	<p>Excessive regeneration of power. When the drive is driven by an external mechanical power source, it may regenerate too much peak energy through the drive's power supply. The system faults to save itself from an overload.</p> <p>Excessive AC input voltage.</p> <p>Output short circuit.</p> <p>Motor cabling wires shorted together.</p> <p>Internal motor winding short circuit.</p>	<p>Change the deceleration or motion profile.</p> <p>Use a larger system (motor and Ultra3000).</p> <p>Use an Active Shunt.</p> <p>Verify input is below 264 VAC.</p> <p>Disconnect the power line from the drive and then do continuity check from the positive and negative poles of the DC Bus to each of the motor output phases U,V, and W. If a continuity exists, check for wire fibers between terminals, or send drive in for repair.</p> <p>Disconnect motor power cables from the drive. If faults stop, then either replace cable or try to find the short.</p> <p>Verify by disconnecting motor from drive and then try to turn</p>

				by hand. If difficult to turn by hand, the motor needs to be repaired or replaced.
11	Illegal Hall State	ON indicates there is a problem with the motor's Hall Effect sensors.	Incorrect phasing Bad connections	Check the Hall phasing. Verify the Hall wiring. Verify power supply to encoder.
12	Home Search Failed	ON indicates that the home position was not found.	Home sensor or marker is outside the overtravel limit.	Check wiring Reposition the overtravel limits or home sensor.
13	Home Position Outside Limits	ON indicates that the home position exceeds a hardware overtravel limit value.	Home sensor, marker or final home position exceeds a hardware overtravel limit.	Reposition the overtravel limits or home sensor. Adjust the final home position.
14	Net communication	ON indicates DeviceNet communications network is broken.	DeviceNet communications network is broken.	Troubleshoot DeviceNet.
15	Electrical Cycle	(For linear motors only) ON indicates there is a problem with the motor's maximum line count.	Electrical cycle length exceeds maximum lines per electrical cycle.	Replace the linear motor/encoder.
16	SERCOS Overtravel	ON indicates SERCOS overtravel limit exceeded.	Programmed overtravel limit has been exceeded.	Verify motion profile. Verify overtravel settings are appropriate.
17	User Current	ON indicates the User Current Fault level, input above, has been exceeded.	User-specified average current level exceeded.	Increase User Current Level and Time to a less restrictive setting. Increase time allowed for motion
18	Overspeed	ON indicates the motor speed has exceeded 125% of maximum rated speed.	Motor exceeded 125% of the-specified maximum rated speed.	Check cables for noise. Check Motor wiring. Retune drive & motor combination. Use an actual oscilloscope to check Encoder phasing.
19	Following Error	ON indicates the Following Error Limit, set above, has been exceeded.	Position error limit exceeded.	Retune the drive, start by setting the feedforward gain to 100%. Increase the Following Error Limit and Time. If in Follower Mode, increase the Slew Limit (in the Follower window). Check position loop tuning.
20	Motor Encoder State	ON indicates the motor encoder encountered an illegal transition.	Motor encoder encountered an illegal transition	Replace the motor/encoder. Use shielded cables with twisted pair wires. Route the feedback away from potential noise sources. Check the system grounds. Ensure digital filtering of encoder signals is enabled.

			Bad encoder	Replace motor/encoder.
21	Auxiliary Encoder State	ON indicates the auxiliary encoder encountered an illegal transition.	Auxiliary encoder encountered an illegal transition Setup time violation for Step/Direction or CW/CCW input.	Use shielded cables with twisted pair wires. Route the encoder cable away from potential noise sources. Bad encoder - replace encoder. Check the ground connections. Check timing of inputs to determine if setup time requirements are met.
22	Motor Filter	ON indicates the internal filter protecting the motor from overheating has tripped.	Motor overheated	Reduce acceleration rates. Reduce duty cycle (ON/OFF) of commanded motion. Increase time permitted for motion. Check system tuning. Use larger Ultra3000 and motor.
23	Thermal Protect Filter	ON indicates the internal filter protecting the drive from overheating has tripped.	Drive overheated	Reduce acceleration rates. Reduce duty cycle (ON/OFF) of commanded motion. Increase time permitted for motion. Check system tuning. Use larger Ultra3000 and motor.
24	Velocity Error	ON indicates that the velocity error exceeds the Velocity Error Fault Limit for a length of time greater than the Velocity Error Fault Time value.	Velocity error limit exceeded.	Increase Velocity Error Fault Limit or Velocity Error Fault Time value or both. Reduce Acceleration.
25	Sensor not assigned	ON indicates that homing or registration motion was attempted without a sensor assigned.	Homing or registration motion attempted without a sensor assigned.	Assign a sensor to a digital input.
26	User Velocity	ON indicates the User Velocity Fault level, above, has been exceeded.	User-specified velocity level exceeded.	Increase User Velocity Fault Level and Time to a less restrictive setting.
27	Axis Not Homed	ON indicates that a absolute move was tried, before Home position was defined.	Absolute positioning attempted without homing.	Verify homing position.
28	Motor Parameter Error	ON indicates a parameter loaded from a smart encoder or a SERCOS blob is incompatible with the drive.	Connection to an improperly programmed or incompatible smart encoder. An attempt to load a SERCOS blob for a motor that is not supported by the drive.	Select a different SERCOS motor blob. Install a different motor.

29	Excessive Output Frequency	ON indicates the motor encoder output frequency exceeds the maximum value. Note: This fault can only be generated when the encoder output is synthesized by the Ultra3000.	Encoder output frequency exceeds the maximum value.	Increase the encoder output maximum frequency parameter. Decrease the encoder interpolation parameter. Increase the encoder output divider parameter. Reduce motor speed.
30	Encoder Communication	ON indicates loss of communication with an intelligent encoder.	Communication was not established with an intelligent encoder.	Verify motor selection. Verify the motor supports automatic identification. Verify motor encoder wiring.
31	Encoder Data	ON indicates encoder data is corrupted.	Encoder data is corrupted.	Replace the motor/encoder.
32	Excessive Interpolated Feedback Frequency	ON indicates Sine/Cosine frequency of encoder exceeds specified value. Note: This fault can only be generated when the encoder output is synthesized by the Ultra3000.	Encoder output frequency exceeds the maximum user specified value.	Reduce motor speed. Use encoder with lower resolution (before interpolation).
33	Absolute Position Exceeds Position Rollover	ON indicates motion is commanded to a position outside the position rollover range. The position rollover range is [0 .. machine cycle size - 1]. Note: This fault can only be generated when the machine cycle position rollover is enabled.	An absolute index is initiated that specifies a position outside the position rollover range. A homing cycle is initiated with the home position outside the position rollover range. A define home is initiated with the home position outside the position rollover range. A preset position is initiated that specifies a position outside the position rollover range. The home position parameter is changed to a value outside the position rollover range, the system has absolute feedback and the drive is reset or power cycled.	Set motion command to a position within the position rollover range.
34	Ground Short Circuit	ON indicates the motor ground is shorted.	Wiring error Motor internal ground short	Check motor power wiring. Replace motor.

			Internal malfunction	Disconnect motor power cable from drive and enable drive with current limit set to 0. If fault remains, call your A-B representative. If fault clears, a wiring error or an error internal to the motor exists.
35	Soft-Starting Fault	ON indicates a soft fault at startup.	Low AC input voltage Internal malfunction	Check AC input voltage on all phases. Call your A-B representative.
36	Power Module Overtemperature	ON indicates an overtemperature condition in the power module.	Excessive heat in power circuitry.	Reduce acceleration rates. Reduce duty cycle (ON/OFF) of commanded motion. Increase time permitted for motion. Use large Ultra3000 and motor. Check motor tuning.
37	AC Input Phase Loss	ON indicates incorrect power phasing.	Loss of one or more phases of power.	Check AC input voltage on all phases.
39	Self-sensing Commutation Startup Error	ON indicates a self-sensing commutation error was encountered during startup	Motion required for self-sensing startup commutation was obstructed.	Verify that there are no impediments to motion at startup, such as hard limits. Increase self-sensing current if high friction or load conditions exist. Verify the line count, pole count, or electrical cycle length motor parameters. Swap any two motor connections and verify the motor feedback counts in the correct direction during positive motor movement.

5.6 SPEED PERFORMANCE GRAPH

The speed performance graph shown below is to be used as a guide only. Actual feeder/press speeds may vary depending on factors such as material thickness, width, rigidity, surface finish, and free loop.

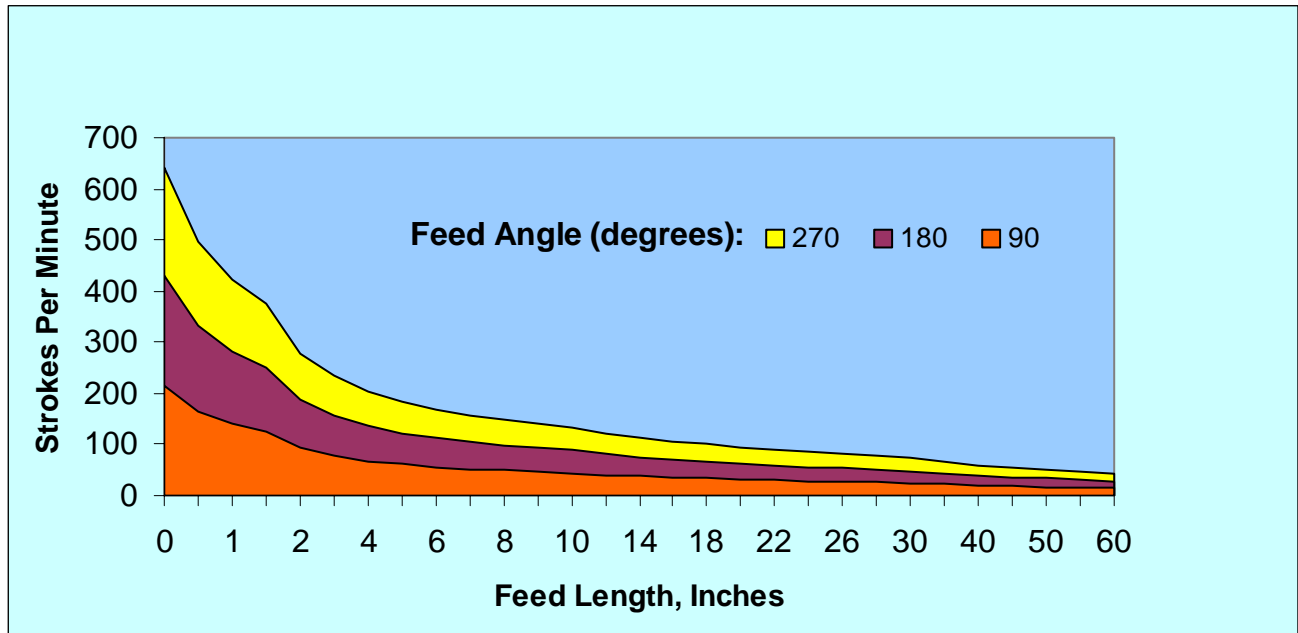


Figure 6.

6. PNEUMATIC PILOT RELEASE

During operations such as forming or using pilots, the purpose of the Pneumatic Pilot Release is to release the strip from being held by the feeder rolls. This allows the material to be adjusted slightly any time during the press cycle.

The pneumatic release mechanism is mounted centrally on the top of the feeder using (4) M8 screws and washers in slotted holes. The slots are to allow proper alignment and adjustment with the release arm and roller.

Open the rolls allowing clearance between the upper roll and the material approximately 0.010"/0.25 mm. (Use a shim on top of the material, if needed.)

Position the Pilot Release mechanism so that with the cylinder piston fully extended against the roller.

The SRF Pilot Release mechanism is pre-assembled, only needing outside air and electrical connections. For air connections, refer to Figure 6.

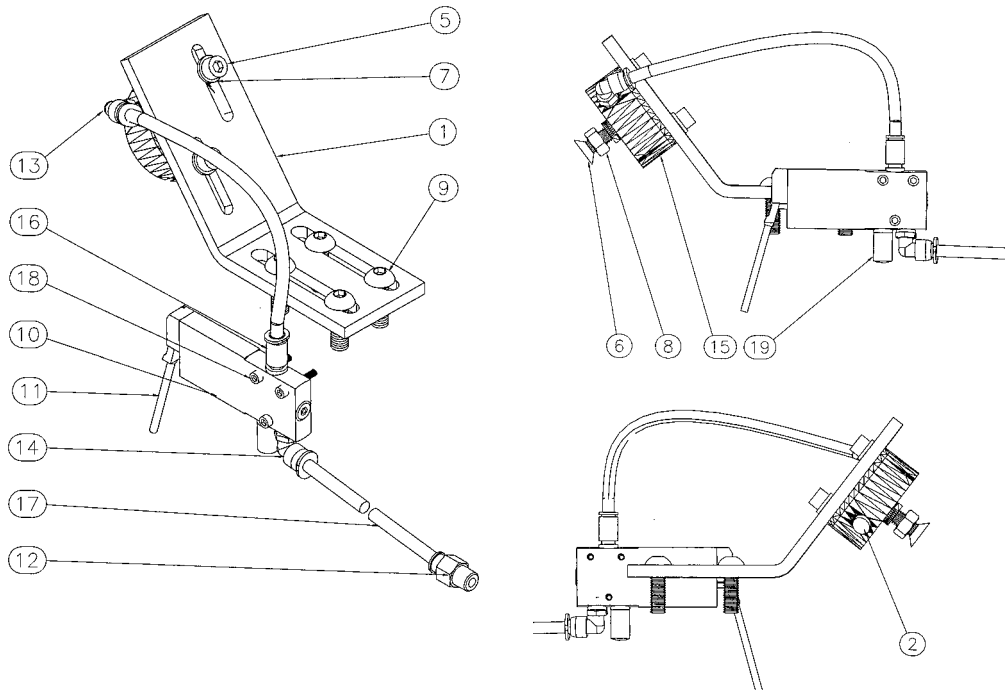
The release is operated through the 3-way solenoid valve when the appropriate voltage signal is applied. This power signal can come from a source such as a rotary cam switch.

The solenoid valve, located on the side of the feeder body, is provided with a cable attached to the solenoid valve for connecting the power signal leads.

Air pressure of 80-100 PSI is required for proper operation of the release. A 1/4" tubing fitting is provided for the air supply connection.

6.1 PILOT RELEASE PARTS LIST AND DIAGRAM

Item	Q-ty	Description	Item	Q-ty	Description
01	01	Bracket	12	01	Straight fitting
02	01	Silencer	13	01	Elbow fitting
05	02	Screw, M6x20	14	01	Elbow fitting
06	01	Screw M8x25, flat head	15	01	Pneumatic cylinder
07	02	Flat washer, M6	16	01	Straight fitting
08	01	Hex nut, M8	17	04	Tubing
09	04	Screw, M8x25	18	03	Screw, M3x20
10	01	3 way valve, 24VDC	19	01	Silencer
11	01	Valve solenoid cable			



7. MAINTENANCE

The Mini Servo Roll Feed needs very little maintenance to keep the system operating at its optimum performance.

- This precision equipment must be kept as clean as possible. This is especially important if large amounts of air suspended oil mists in combination with “dirty metals” are used. The resulting abrasive dust can attach itself to the feed rolls and other surfaces, leading to premature wear on many parts.
- The roll release system requires a clean, dry air supply.
- Some bearings used on the feeder are fully sealed and maintenance-free roller ball bearings. The exceptions are provided with standard “zerk” type grease fittings. They should be lubricated with a good grade of high pressure bearing grease. The frequency of lubrication will depend on the overall usage of the system. A small “shot” once a day is a good starting point. The cluster gear set should be coated with a small amount of open gear grease.
- The main drive belt should be checked periodically for tightness. It can be adjusted by loosening the three fasteners on the motor adjuster plate, applying downward pressure on the plate, and retightening. **ERRATIC MOTOR BEHAVIOR WILL BE EXPERIENCED IF THE DRIVE BELT IS LOOSE!**
- All fasteners should be checked for tightness at regular intervals. The electrical system also requires very little maintenance. Keep the enclosure clean and replace any burned indicator bulbs. Do not expose the electrical enclosure to constant high temperatures. Possible system failure could result.
- The Feeder’s electrical enclosure door is sealed to prevent oil and contaminants from entering inside. However, small gaps can be found around some sealing surfaces and faceplates. It is a good idea, therefore, to keep the console free of stamping oils and fluids, which could “seep into” the enclosure. Most often these oils are carried by the operator’s hands or by air mist lubrication etc.
- All of the above guidelines should be added to your existing pressroom Preventive Maintenance (PM) Program.

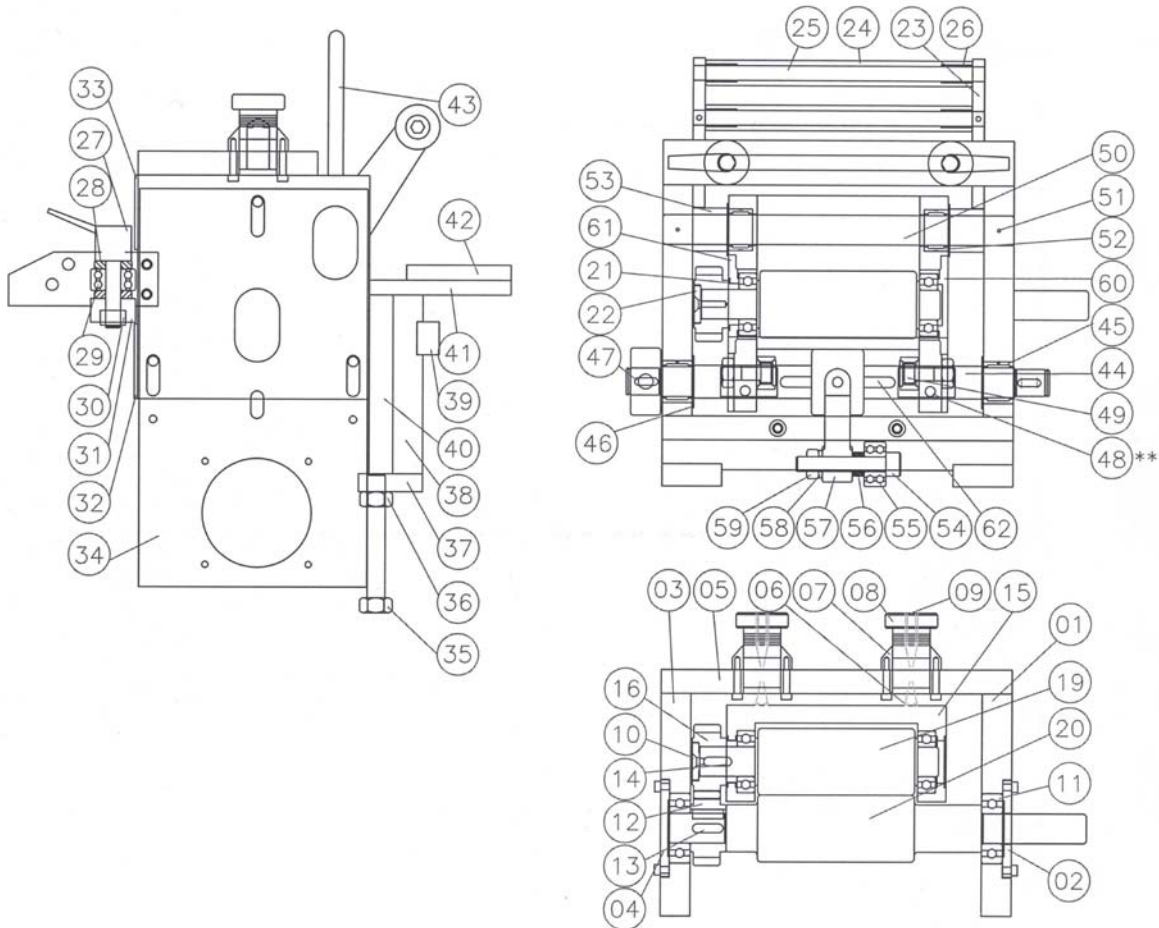
8. ROLL FEED PARTS LIST & DIAGRAM

List of parts that are common for 105M through 320M models

Item	Q-ty	Part #	Description	Item	Q-ty	Description	Part #
01	01	R-SRF-MINI-01	Left housing bearing	35	01	Hex head cap screw	DIN-912-M14x120
02	01	R-SRF-MINI-02	Lower front dust shield	36	01	Nut	DIN-934xM14
03	01	R-SRF-MINI-03	Right housing bearing	37	01	Adjustment tab	R-SRF-MINI-37
04	01	R-SRF-MINI-04	Lower rear dust shield	39	02	Key	18144
02	02	R-SRF-MINI-06	Spring	43	02	Manual release lever	R-SRF-MINI-43
07	02	R-SRF-MINI-07	Spring housing	45	02	Needle bearing	R-SRF-MINI-45
08	02	R-SRF-MINI-08	Adjust screw	46	04	Thrust race	R-SRF-MINI-46
09	02	DIN-916-M12x12	Set screw	47	01	Key	15104-24
10	01	DIN-7991-M5x16	Flat head screw	48	02	Ball point screw	R-SRF-MINI-48
11	04	R-SRF-MINI-11	Bearing	49	02	Cam follower	R-SRF-MINI-49
12	01	R-SRF-MINI-12	Lower gear	51	02	Set screw	
13	01	15104-22	Key	52	02	Needle bearing	R-SRF-MINI-52
14	01	15104-23	Key	53	02	Lower roll spacer	R-SRF-MINI-53
16	01	R-SRF-MINI-16	Upper gear	54	01	Hex head cap screw	DIN-912-M10x60
21	01	R-SRF-MINI-21	Upper roll spacer	55	03	Roll release bearing	R-SRF-MINI-55
22	01	R-SRF-MINI-22	Upper roll fixed plate	56	01	Release bearing spacer	R-SRF-MINI-56
23	02	R-SRF-MINI-23	Cascade bracket	57	01	Mechanical release lever	R-SRF-MINI-57
26	04	R-SRF-MINI-26	Dry bearing	58	01	Washer	DIN-1278-M10
27	02	R-SRF-MINI-27	Adjustable hand lever	59	01	Nut	DIN-934-M10
28	01	R-SRF-MINI-28	Guide roll spacer	60	01	Upper front dust shield	R-SRF-MINI-60
29	01	R-SRF-MINI-29	Bearing	61	01	Upper rear dust shield	R-SRF-MINI-61
30	02	DIN-934-M10	Hex nut	62	01	Key	15104-25
34	01	R-SRF-MINI-34	Motor bracket				

List of parts that are different between 105M through 320M models

Item	Q-ty	105M Part #	220M Part #	320M Part #	Description
05	01	R-SRF-105M-05	R-SRF-220M-05	R-SRF-320M-05	Upper plate
15	01	R-SRF-105M-15	R-SRF-220M-15	R-SRF-320M-15	Upper roll bracket
19	01	R-SRF-105M-19	R-SRF-220M-19	R-SRF-320M-19	Textured Upper roll
20	01	R-SRF-105M-20	R-SRF-220M-20	R-SRF-320M-20	Textured lower roll
24	01	R-SRF-105M-24	R-SRF-220M-24	R-SRF-320M-24	Entry roll cascade
25	02	R-SRF-105M-25	R-SRF-220M-25	R-SRF-320M-25	Shaft
31	01	R-SRF-105M-31	R-SRF-220M-31	R-SRF-320M-31	Roll guide bar
32	01	R-SRF-105M-32	R-SRF-220M-32	R-SRF-320M-32	Lower cover
33	01	R-SRF-105M-33	R-SRF-220M-33	R-SRF-320M-33	Upper cover
38	01	R-SRF-105M-38	R-SRF-220M-38	R-SRF-320M-38	Transition plate
40	01	R-SRF-105M-40	R-SRF-220M-40	R-SRF-320M-40	Mounting plate
41	01	R-SRF-105M-41	R-SRF-220M-41	R-SRF-320M-41	Exit plate
42	01	R-SRF-105M-42	R-SRF-220M-42	R-SRF-320M-42	Material hold down plate
44	01	R-SRF-105M-44	R-SRF-220M-44	R-SRF-320M-44	Roll release shaft
50	01	R-SRF-105M-50	R-SRF-220M-50	R-SRF-320M-50	Fixed shaft



WARNING

This equipment offers various means of operating or controlling machines. The operator must not be in or near the point-of-operation of the machine, or the operating parts of any equipment installed on the machine, or bodily injury could result. The EMPLOYER must post adequate warning signs onto the machine with proper warnings for his machine and the specific application to which the machine and equipment are being applied.

Occupational Safety and Health Act (OSHA) Sections 1910.211, 1910.212, and 1910.217 contain installation information on the distance between danger points and point-of-operation guards and devices. No specific references have been made to which paragraph of OSHA 1910.211, 1910.212, 1910.217 or any other applicable sections because the paragraphs may change with each edition of the publication of OSHA provisions.

All equipment manufactured by us is designed to meet the construction standards of OSHA in effect at the time of sale, but the EMPLOYER installs the equipment so the EMPLOYER is responsible for installation, use, application, training, and maintenance, as well as adequate signs on the machine onto which this equipment will be installed.

Remember, OSHA says that the EMPLOYER must use operating methods designed to control or eliminate hazards to operating personnel.

It shall be the responsibility of the EMPLOYER to establish and follow a program of periodic and regular inspections of his machine to insure that all their parts, auxiliary equipment, and safeguards are in a safe operating condition and adjustment. Each machine should be inspected and tested no less than weekly to determine the condition of the machine. Necessary maintenance or repair of both shall be performed and completed before the machine is operated. The EMPLOYER shall maintain records of these inspections and the maintenance work performed.

Our Company is not responsible to notify the user of this equipment of future changes in State or Federal laws, or construction standards.

SAFETY PROGRAM

Accident free operation will result from a well developed, management sponsored and enforced safety program. Of vital importance to any successful program is the proper selection of guards and devices. However, there is no safety device that will bring "automatic" safety to your operation.

Of equal importance to this proper selection of the guard and the device is the training of your personnel. Each person must be trained as to the operation of the guard or safety device, highlighting why they have been provided on the equipment. Rules for safe operating should be written and enforced at all times. A final major concern of an effective safety program is regularly scheduled inspection and maintenance of all of the equipment.

To ensure continued safety at all times, top management, line supervision, safety engineers and all employees must assume their proper share of the responsibility in the program. Only as a group, one that knows your own operation and its problems, can you carry out an effective safety program.

To assist you in the development of and continued use of safety programs, many safety minded groups have made guidelines available to you. However, you must know when and how to apply these guidelines. The manufacturer provides information to assist you in properly adjusting and maintaining your equipment. There is no short cut to proper safety; therefore, it is recommended that you comply with their recommendations at all times.

WARRANTY

We warrant our new parts against defects under normal use and service for a period of 12 months after date of shipment. Our obligation under this warranty is limited to replacing or repairing (at our option) the defective part without charge, F.O.B. our plant in Bloomfield, Connecticut. The defective part must be forwarded to our plant, freight prepaid, for our inspection prior to replacement or repair. EXCEPT AS EXPRESSLY PROVIDED HEREIN, THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING A WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Furthermore, the seller does not warrant or represent that the equipment complies with the provisions of any law, particularly including the Occupational Safety and Health Act of 1970, and regulations promulgated thereunder. In no event shall we be liable for special, indirect incidental or consequential damages, however rising.



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