

Operation Manual
ULTRA EDGE
SEQUENTIAL
SERVO ROLL FEED
Models SRF-100/125/200/300/400/500/600



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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 IN SHIPMENT 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.

1 INTRODUCTION

IMPORTANT

Before turning the system on for the first time, verify that installation has been completed according to the Installation manual and the main input voltage is 220 VAC, single phase.

The P/A Industries *Ultra Edge Sequential Servo Roll Feed (Ultra Edge Sequential)* is a state of the art AC Servo feed, which simplifies Operator adjustments to feed parameters. These Operator adjustments are entered into the control memory through the keypad. With the use of positional limit switches, the process equipment signals the feeder when to begin moving the strip, when the feed pitch must be completed, when the process equipment has completed its down stroke, and with optional pneumatic pilot release, when to open the rolls for piloting.

The *Ultra Edge Sequential* performs a job when the application requires:

- a) use of selectable tool/gag combination along with selectable feed length for every press cycle. (Press application);
- b) use of selectable punch/press combination along with selectable feed length for every feed cycle – (Punching Bench or Multiple Press application);

The mechanical simplicity, accuracy, and ease of use of the *Ultra Edge Sequential* will help to improve your quality and production for years to come.

2 THEORY OF OPERATION

2.1 MECHANICAL ASSEMBLY

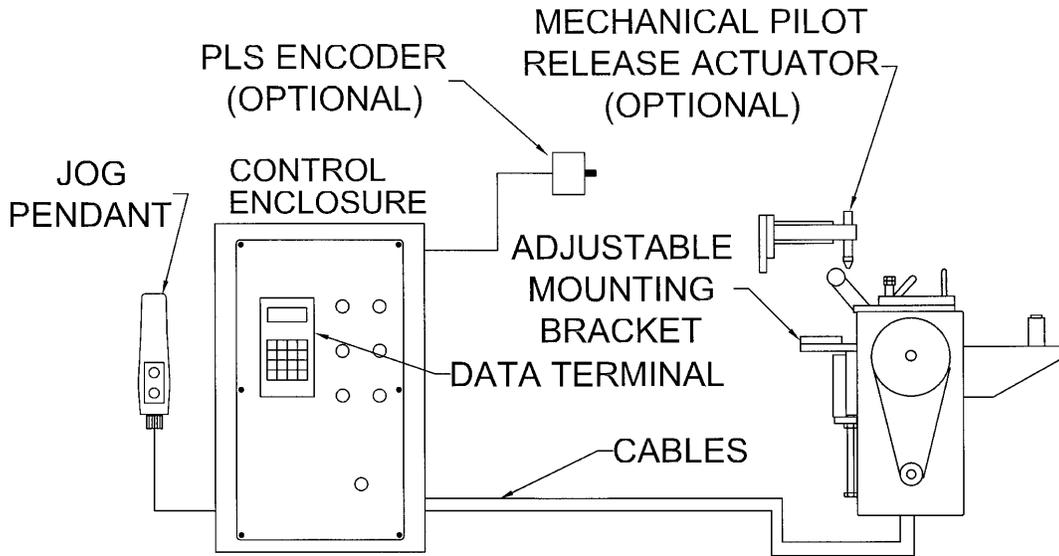
Mechanical assembly consists of:

- 1) Adjustment/Mounting bracket
- 2) Feeder
- 3) Servomotor
- 4) Mechanical pilot release actuator (optional)

2.2 ELECTRICAL CONTROL ENCLOSURE ASSEMBLY

Electrical control enclosure consists of:

- 1) Control switches/buttons/relays
- 2) Power supply, 24 VDC/5 VDC
- 3) Servo drive
- 4) Data entry terminal
- 5) Cabling
- 6) Jog Pendant



All Ultra Edge Sequential controls are conveniently located on the front side of the electrical enclosure

CONTROL/DEVICE	DESCRIPTION
Power On/Reset button	Turns controller on, resets the servo drive.
In Position indicator light, white	Turns on when move is complete and motor is holding position.
Cycle Start illuminated button, green	Puts controller into "Auto" mode from "Manual" mode, starts Auto cycling.
Cycle Stop button, red:	Stops Auto cycling and returns the controller to "Manual" mode.
Emergency Stop mushroom button, red	Shuts controller off and any other equipment wired to its auxiliary contact.
Operator terminal	Displays controller's data, current feed status, drive error codes and enters data into controller.
"Programming Locked / Unlocked" key-switch	Locks access to programming.
Forward / Reverse remote jog pendant	Pendant is attached to the enclosure through retractile cable.

2.3 SERVO MOTOR/DRIVE OPERATION

The introduction of servomotor technology to the press roll feed has pushed the limits of accuracy, adjustability, and performance to levels previously unattainable.

The following example is based on the Ultra Edge Servo Roll Feed Standard, US (SRF-125, 200, 300, 400, 500, 600) models. The actual numbers for SRF-100 or metric models are different.

Each revolution of the servomotor produces 1048576 encoder pulses. Every 2.909 revolutions of the servo motor shaft produce 1 revolution of the feed rollers. The circumference of the lower roll is approximately 11.138 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 11.138 inches is entered into the feeder, this will result in **exactly** one revolution of the feed rolls. The motor will accelerate and turn 2.909 turns. This will produce $(2.909 \times 1048576 = 3050307)$ pulses of the encoder. The feeder will decelerate and stop, when 3050307 pulses are detected. The feeder is now **in position**. The result is an accurately positioned strip **exactly** 11.138 inches from its starting point. This entire process happens in milliseconds.

2.4 TOOL STORAGE OPERATION

Consider a **Step** as a single action of the servo roll feed associated with moving a material strip for a programmable distance and activating a programmable combination of output relays. Each **Step** can be repeated up to 999 times. There are 1000 **Steps** available in the servo drive.

Consider a **Tool** as a set of **Steps** associated with a certain press die (tool, part, job, etc.).

Consider the **Tool storage** as a part of the servo drive memory dedicated for storage of 200 **Tools** (200 step sets).

NOTE: Keep in mind that **Tool storage** can hold up to 200 **Tools**, the total amount of **Steps** remains 1000, so if the first **Tool** takes 25 steps, the remaining 199 potential **Tools** would have 975 **Steps** to share.

Consider an **Active Tool** as a copy of a **Tool**.

Tools are organized by **Tool number**, which is user definable and can contain up to 7 digits.

The servo drive program never uses original **Tools** from the **Tool storage** - every time a **Tool** is called up (activated) the program makes a copy of it (**Active Tool**), places this copy into a dedicated memory location and then uses it. There are no communications between a **Tool** and **Active Tool**, they are virtually independent of each other. If a **Tool** gets changed it must be reactivated in order to apply changes to the **Active Tool**.

NOTE: Deleting a **Tool** causes deletion of the **Active Tool** as well.

NOTE: An **Active Tool** remains active after power recycling.

NOTE: Only one of the **Active Tool** parameters can be edited: **Batch Count**.

It takes just a few keystrokes to activate a **Tool**.

3 PROGRAMMING THE ULTRA EDGE SEQUENTIAL SYSTEM – OVERVIEW

NOTE: Before attempting any programming, make sure that the “**PROGRAMMING LOCKED / UNLOCKED**” key switch is in the “**Unlocked**” position.

IMPORTANT: After power shutdown, **WAIT for 10 seconds** before powering up the Feed.

Turn on the main power disconnect switch. This applies power to the control power supply. Press the green **Power On** push-button. The button will illuminate and the **OPERATOR** terminal display will be visible.

Wait for the **IN POSITION** light to illuminate.

Press any key to begin.

```

P/A Industries
Really Cool Feed
Version 1.10 SEQ
Hit any key to cont.

```

NOTE: The **OPERATOR** terminal has five mode keys, they are:

- “OPER”
- “TOOLS”
- “SETUP”
- “F1”
- “F2”

NOTE:  The flashing cursor is waiting for the value to be entered.

NOTE: < The pointer prompts to press the “ENTER” key.

NOTE: To confirm any ENTRY, press “ENTER”.



3.1 “OPER” KEY

“OPER” key controls toggles between two screens: **FEED STATUS** screen and **OPERATOR** screen.

FEED STATUS screen shows:

```

T#1
Manual Mode
30 / Cont.Run
Press a Mode Key

```

- Active tool number. In case there is no active tool “No Tool!” message is displayed instead

- Current mode of the feed
- Batch Count, current and total

OPERATOR screen shows Batch Count parameter and **Step Status** command and allows editing batch count:

```
Count          Cont.Run
Step Status    <
Press OPER to exit
```

Count is the number of cycles that should be performed. It is a numeric entry with a range of 0 to 9999999. Entering “0” will result in a continuous run.

Step Status command opens a screen that shows which step is currently running and how many times it has been repeated

```
T#1
Step    1    of 25
Repeat  1    of 3
Press OPER to exit
```

Every time the “**OPER**” key is pressed it toggles between the **FEED STATUS** screen and the **OPERATOR** screen.

3.2 “TOOLS” KEY

“**TOOLS**” key controls appearance of **TOOL STORAGE** screens. Press the “**TOOLS**” key to open the first screen. This allows the Operator to choose a Tool Storage operation: “**Edit Tool**”, “**Activate Tool**”, or “**Create New Tool**”.

```
Edit Tool
Activate Tool <
Create New
Press TOOLS to exit
```

Position the pointer on desired line, using “↑” and “↓” keys , and press the “**ENTER**” key.

Enter in the tool number or select it from the tool list using “↑” and “↓” keys and press the “**ENTER**” key again.

```
Edit Tool#1
Arrow keys to scroll
Press TOOLS to exit
```

```
Activate
  Tool#1
Arrow keys to scroll
Press TOOLS to exit
```

```
Create Tool#
Press TOOLS to exit
```

NOTE: Tool number can contain up to seven digits.

If “**Activate Tool**” operation is chosen, then the desired tool will be activated and a message will be displayed for a few seconds:

```
Tool Activated
```

The display will then show the **FEED STATUS** screen.

```
Tool#1      Spd:384
      Auto Mode
30          / Cont.Run
      Press a Mode Key
```

If “**Activate Tool**” or “**Edit Tool**” operation is chosen and the entered tool number doesn’t exist, the following message will be displayed:

```
Tool doesn't exist!
```

The display will show the previous screen.

```
Edit Tool#
Arrow keys to scroll
Press TOOLS to exit
```

Or

```
Activate
  Tool#
Arrow keys to scroll
Press TOOLS to exit
```

If “**Edit Tool**” or “**Create New Tool**” operation is chosen, then the next screens will allow editing of the step parameters. Position the cursor on desired line, using “**↑**” and “**↓**” keys, enter in the desired value, and press the “**ENTER**” key. Press “**TOOLS**” to open the next screen or “**BKSP**” – the previous.

```
T#1      S#1  /24
Length      60.000
Gags        00011
Press TOOLS for next
```

Length is a distance in inches (or millimeters) of the “**Feed Length**”. It is a numeric entry with a range of 0 to the 999999.

Gags is a combination of the outputs that are activated (fired) at the step. It is a binary entry. Five digits represent five outputs, starting from the right, 0 represents inactive output, 1 - active.

```
T#1          S#1  /24
Repeat          2
Exit editing   <
TOOLS-next BKSP-Prev
```

Repeat is the number of times the step must be repeated. It is a numeric entry with a range of 0 to 999.

Exit editing is a command that allows saving the currently edited tool, saving it with a different name, or deleting it from the drive memory.

NOTE: Up to 200 tools can be saved.

```
T#1
Save          <
Save as
TOOLS-next BKSP-Prev
```

Use **SAVE** to save the tool being edited. Press the “**ENTER**” key.

```
Tool#1      Saved
```

Use **SAVE AS** to create a new tool using the settings of the one being edited. Press the “**ENTER**” key, enter desired new tool number, and press the “**ENTER**” key again.

```
Save As Tool#
Press TOOLS to Abort
```

```
Save As #1234567
```

```
Tool#1234567 Saved
```

The display will show the **FEED STATUS** screen.

```

T#1
      Auto Mode
30      / Cont.Run
      Press a Mode Key

```

If saving is skipped, then the next screen allows deleting the tool being edited. Press “**TOOLS**” to open it. Press the “**ENTER**” key, the warning message will be displayed, press “**1**” key to confirm deleting or any key to abort.

```

T#1
Delete Tool      <
TOOLS-next BKSP-Prev

```

```

Delete Tool#1
  Press 1 to confirm
Another key to abort

```

The corresponding message on the next screen confirms the chosen command execution.

```

Tool#1 Deleted

```

or

```

Aborted!

```

Display will show **FEED STATUS** screen.

```

T#1
      Auto Mode
30      / Cont.Run
      Press a Mode Key

```

NOTE: To exit tool editing at any time, press the “**OPER**” key. Changes **will not** be saved.

3.3 “F1” KEY

F1 allows manipulation of existing tool steps, performing such actions as adding steps, deleting steps, inserting steps, and copying steps.

While being on any of the step screens press **F1**, the following screen opens.

```

Add Step      <
Delete Step
Insert Step
Press F1 for next
    
```

Position the cursor on desired line, using “↑” and “↓” keys and press the “ENTER” key. Press “F1” to open the next screen. Press “ENTER” key to perform a step copy.

```

Copy Step      <
F1-Exit  BKSP-Prev
    
```

If the **Add Step** command is executed, the program adds a new step next to the existing last one and the following screen opens:

```

Step 2 added
Add another step?
Yes      <
No
    
```

The **Delete** command must be executed from either screen of the step that is to be deleted:

```

T#1      S#20 /24
Length      60.000
Gags      00011
Press TOOLS for next
    
```

Press **F1**, then position the cursor next to **Delete Step** command and press **Enter** key:

```

Add Step
Delete Step      <
Insert Step
Press F1 for next
    
```

```

Delete Step 20
Press 1 to confirm
Another key to abort
    
```

```

Step 20 deleted!
    
```

or

```

Aborted!
    
```

The **Insert** command allows a step to be placed before or after the current step.

```
T#1          S#20 /24
Length      60.000
Gags       00011
Press TOOLS for next
```

Press **F1**, then position the cursor next to **Insert Step** command and press **Enter** key:

```
Add Step
Delete Step
Insert Step <
Press F1 for next
```

Position the cursor next to desired command and press **Enter** key:

```
Insert Step
Before Step 20 <
After Step 20
Press BKSP for prev.
```

The Copy command can be executed from any step:

```
T#1          S#20 /24
Length      60.000
Gags       00011
Press TOOLS for next
```

Press **F1**,

```
Add Step <
Delete Step
Insert Step
Press F1 for next
```

Press **F1** again,

```
Copy Step <
F1-Exit BKSP-Prev
```

Specify which step is to be copied and where to, then position the cursor next to command **Perform Copy** and press **Enter** key.

```
Copy Step 3
Into Step 7
Perform copy <
Press BKSP for prev.
```

```
Step copied!
```

3.4 “SETUP” KEY

“SETUP” key controls the appearance of setup screens. Seven screens contain parameters of the feed that are not changed often or are never changed. Press “SETUP” key **three times** to open the first screen. Position the cursor on the desired line, using “↑” and “↓” keys, enter in desired value and press the “ENTER” key. Press “SETUP” key to open the next screen or “BKSP” – the previous.

```
Speed          72.00
Accel          400.00
Decel          400.00
SETUP-next    BKSP-Prev
```

Speed is the maximum velocity of the material in in/sec (or mm/sec). It is a numeric entry with a range of 0 to 72 in/sec (1828mm/sec) for *Standard* model and 0 to 41 in/sec (1041 mm/sec) for *Heavy Duty* models.

Accel is the rate of acceleration in in/sec² (or mm/sec²). It is a numeric entry with a range of 0-to 1000 in/sec² (25400 mm/sec²). Normally set to 400 in/sec² (10160 mm/sec²).

Decel is the rate of deceleration in in/sec² (or mm/sec²). It is a numeric entry with a range of 0-to 1000 in/sec² (25400 mm/sec²). Normally set to 400-in/ sec² (10160 mm/sec²). Enter “0” to duplicate **Accel** rate.

```
Jog Speed %    5
JogAccel       10.0
JogDecel       10.0
Press SETUP for next
```

Jog speed is the maximum jogging speed. It is a numeric entry with a range of 0 to 99 percent of the **Speed** parameter. Normally set between 1-5%.

JogAccel is the rate of jogging acceleration. It is a numeric entry with a range of 0-to 300-in/sec². Normally set 10 in/sec².

JogDecel is the rate of jogging deceleration. It is a numeric entry with a range of 0-to 300-in/sec². Normally set 10-in/sec².

```
InPosition     0.0200
Dwell          100
Application    Press
SETUP-Next    BKSP-Prev
```

InPosition is a tolerance window around the final position. This is used to verify the feed index accuracy is within acceptable limits before continuing onto the next function. It is a numeric entry with a range of 0 to 100 inch. Normally set 0.02 inch.

Dwell controls the “On” duration of the “Permit Press” output while the control is in **Press** application. The next feed length will not be started until the **Dwell** time has expired.

Dwell controls the “On” duration of the **Gag** outputs while the control is in **Punch** (punching bench or multiple press) application.

It is a numeric entry with a range of 0 to 100000 msec.

Application is a parameter that selects whether the feeder runs in the **Press** application or the **Punch** application. In the **Press** application the feed is controlled by **Feed** cam signal and **Reset** cam signal. The **Gag** outputs are activated/deactivated at the beginning of every **Feed** signal, so the activation/deactivation of the tools happens during the material feeding. In the **Punch** (punching bench or multiple press) application the feed is controlled only by the **Feed** signal, while a wire jumper must be placed across the **Reset** signal. The **Feed** signal is a series of the punch/press

top position sensors/cam switches. When the material is fed, the **Gag** outputs are activated for the duration of **Dwell** time (must be long enough for the punches to go all the way down or the press to pass BDC-bottom dead center, meaning the press is running in its Single Stroke mode)

```
Scale          7355.00
Direction (1/0)  CW
Debounce (ms)   1
SETUP-Next BKSP-Prev
```

Scale is the encoder scaling parameter used to define the number of encoder counts/inch (or mm). It is a numeric entry. *Standard* model value is 7355 cnts/inch (289.56 cnts/mm). *Heavy Duty* model value is 12871 cnts/inch (506.73 cnts/mm).

Direction controls the direction of positive motor rotation. Entering “0” selects CW and a “1” selects CCW.

Debounce is the amount of time each input should stay HI or LOW, in order to be recognized. It is a numeric entry, with a range of 0 to 999 msec. It is normally set to 1.

```
Kp            200
Pgain         1200
Igain         1
SETUP-Next BKSP-Prev
```

Kp is proportional gain of the position loop. This is a tuning parameter, in order to change its value consult P/A Industries Service Department.

Pgain is proportional gain of the velocity loop. This is a tuning parameter, in order to change its value consult P/A Industries Service Department.

Igain is integral gain of the velocity loop. This is a tuning parameter, in order to change its value consult P/A Industries Service Department.

```
FF            1.0
Kff           1.0
Current Limit 30
SETUP-Next BKSP-Prev
```

FF is an acceleration feedforward gain of the velocity loop. This is a tuning parameter, in order to change its value consult P/A Service Department.

Kff is a feedforward gain of the position loop. This is a tuning parameter, in order to change its value consult P/A Service Department.

Current Limit is a maximum positive and negative current the drive may output to the motor. This is a tuning parameter, in order to change its value consult P/A Service Department.

```
Back Length   0.000
Kerf          0.000
MaxLength     60.000
SETUP-Next BKSP-Prev
```

Back Length is used to protect the material against bending up by the blade in applications where a cutting device is the last step of the tool sequence.

If any value is assigned for this parameter, the feed will move material back for the distance that equals **Back Length** when:

-In the **Press application**, the **cutter bottom position** sensor turns on between the end of the **Feed Cam** signal and the beginning of the **Reset Cam** signal, while only one **Gag** output is active (fired) in the current step.

-In the **Punch application**, the **cutter bottom position** sensor turns on within **Dwell** time and the **Feed** signal remains on.

The **Back Length** is compensated on the next move, so it has no affect on the **Length** parameter. It is a numeric entry, with a range of 0 to 1 inch.

Kerf is a cutting tool width and used for Cut-to-Length application to compensate for a loss of the **Length** caused by width of the tool. It is a numeric entry, with a range of 0 to 10 inches.

Max length is a **Length** limit and protects against accidental entering extra digits, for example: 100 inch instead of 10 inch. It is a numeric entry, with a range of 0 to 999999. (This value is factory set to 20.000.)

NOTE: To exit setup editing at any time, press the “**OPER**” key. Changes **will** be saved.

4 HOW TO ...

4.1 HOW TO CREATE A NEW TOOL

NOTE: Make sure that the **PROGRAMMING “LOCKED / UNLOCKED”** key switch is in “**Unlocked**” position and **FEED STATUS** screen is displayed. If the current screen is not **FEED STATUS** one then press the “**OPER**” key to bring it up.

Press the “**TOOLS**” key.

Position the pointer next to **Create new** tool command and press the “**ENTER**” key.

```

Edit Tool
Activate Tool
Create New <
Press TOOLS to Exit
  
```

Enter a new tool number and press the “**ENTER**” key again.

```

Create Tool#
Press TOOLS to Exit
  
```

```

Create #1
  
```

```

Tool Created
  
```

Position cursor next to desired parameter, enter appropriate value, and press the “ENTER” key. Press “TOOLS” key to open next screen.

```
T#1          S#1  /1
Length          60.000
Gags           00011
Press TOOLS for next
```

To save a newly created tool, position the cursor next to **Exit editing** command and press the “ENTER” key.

```
T#1          S#1  /1
Repeat                2
Exit editing          <
TOOLS-next BKSP-Prev
```

Position the cursor next to Save command and press the “ENTER” key

```
T#1
Save                <
Save as
TOOLS-next BKSP-Prev
```

```
Tool#1      Saved
```

4.2 HOW TO EDIT AN EXISTING TOOL

NOTE: Make sure that the **PROGRAMMING “LOCKED / UNLOCKED”** key switch is in “**Unlocked**” position and **FEED STATUS** screen is displayed. If the current screen is not **FEED STATUS** one then press the “**OPER**” key to bring it up.

Press “TOOLS” key, position the pointer next to **EDIT TOOL** command and press the “ENTER” key.

```
Edit Tool          <
Activate Tool
Create New
Press TOOLS to Exit
```

Enter the desired tool number or select it from the tool list using “↑” and “↓” keys and press the “ENTER” key again.

```
Edit Tool#
Arrow keys to scroll
Press TOOLS to exit
```

```
Edit Tool#1
Arrow keys to scroll
Press TOOLS to exit
```

Position cursor next to desired parameter, enter the new value, and press the “ENTER” key.

```
T#1          S#1  /24
Length          60.000
Gags           00011
Press TOOLS for next
```

```
T#1          S#1  /24
Repeat                2
Exit editing          <
TOOLS-next BKSP-Prev
```

To navigate between multiple steps use “TOOLS” and “BKSP” keys to scroll or move the cursor to the first line, next to S#, enter the desired step number and press “ENTER” key.

Press “F1” key to modify the existing tool using Add, Insert and Copy commands.

```
Add Step          <
Delete Step
Insert Step
Press F1 for next
```

```
Copy Step          <
F1-Exit  BKSP-Prev
```

4.3 HOW TO ADD A STEP TO A TOOL

Open the Tool for editing and press “F1” key,

```
T#1          S#1  /24
Length          60.000
Gags           00011
Press TOOLS for next
```

position the pointer next to **ADD STEP** command and press the “ENTER” key. A new step will be added next to the last existing one.

```
Add Step          <
Delete Step
Insert Step
Press F1 for Next
```

```
Step 25 added
Add another step?
Yes          <
No
```

4.4 HOW TO INSERT A STEP BETWEEN OTHER STEPS

Open the **Tool** for editing:

```
T#1          S#1  /24
Length      60.000
Gags        00011
Press TOOLS for next
```

Bring up the step before or after which you need to insert a new step and press “F1” key,

```
T#1          S#16 /24
Length      60.000
Gags        00011
Press TOOLS for next
```

position the pointer next to **INSERT STEP** command and press the “ENTER” key.

```
Add Step
Delete Step
Insert Step <
Press F1 for next
```

Position the cursor next to desired command and press **Enter** key:

```
Insert Step
Before Step 16 <
After Step 16
Press BKSP for prev.
```

A new step will be inserted and step numbers reassigned accordingly.

4.5 HOW TO COPY A STEP INTO ANOTHER STEP

Open the **Tool** for editing and press “F1” key,

```
T#1          S#1  /24
Length      60.000
Gags        00011
Press TOOLS for next
```

Press **F1** again,

```
Copy Step <
F1-Exit BKSP-Prev
```

Specify which step is to be copied and where to, then position the cursor next to the command **Perform Copy** and press **Enter** key.

```
Copy Step 3
Into Step 7
Perform copy <
Press BKSP for prev.
```

```
Step copied!
```

4.6 HOW TO DELETE A STEP

Open the **Tool** for editing:

```
T#1          S#1  /24
Length      60.000
Gags        00011
Press TOOLS for next
```

Bring up the step that is to be deleted press “F1” key,

```
T#1          S#16 /24
Length      60.000
Gags        00011
Press TOOLS for next
```

position the pointer next to **DELETE STEP** command and press the “ENTER” key.

```
Add Step
Delete Step <
Insert Step
Press F1 for next
```

```
Delete Step 16
Press 1 to confirm
Another key to abort
```

```
Step 16 deleted!
```

or

```
Aborted!
```

4.7 HOW TO CREATE A NEW TOOL USING AN EXISTING ONE

NOTE: Make sure that the **PROGRAMMING “LOCKED / UNLOCKED”** key switch is in “**Unlocked**” position and **FEED STATUS** screen is displayed. If the current screen is not **FEED STATUS** one then press the “**OPER**” key to bring it up.

Press “**TOOLS**” key, position the pointer next to **EDIT TOOL** command and press the “**ENTER**” key.

```

Edit Tool      <
Activate Tool
Create New
Press TOOLS to Exit
    
```

Enter the desired tool number or select it from the tool list using “↑” and “↓” keys and press the “ENTER” key again.

```

Edit Tool#
Arrow keys to scroll
Press TOOLS to exit
    
```

```

Edit Tool#1
Arrow keys to scroll
Press TOOLS to exit
    
```

Modify the existing tool and then choose **Exit editing** command and press the “ENTER” key.

```

T#1          S#1  /24
Length          60.000
Gags           00011
Press TOOLS for next
    
```

```

T#1          S#1  /24
Repeat                2
Exit editing          <
TOOLS-next BKSP-Prev
    
```

Position the cursor next to **Save As** command and press the “ENTER” key.

```

T#1
Save
Save as          <
TOOLS-next BKSP-Prev
    
```

```

Save as Tool#
Press TOOLS to Abort
    
```

Enter the desired new tool number and press the “ENTER” key.

```

Save as #5
    
```

```

Tool#5      Saved
    
```

4.8 HOW TO DELETE A TOOL

NOTE: Make sure that the **PROGRAMMING “LOCKED / UNLOCKED”** key switch is in **“Unlocked”** position and **FEED STATUS** screen is displayed. If the current screen is not **FEED STATUS** one then press the **“OPER”** key to bring it up.

Press **“TOOLS”** key, position the pointer next to **EDIT TOOL** command and press the **“ENTER”** key.

```

Edit Tool          <
Activate Tool
Create New
Press TOOLS to Exit
    
```

Enter the desired tool number or select it from the tool list using **“↑”** and **“↓”** keys and press the **“ENTER”** key again.

```

Edit Tool#
Arrow keys to scroll
Press TOOLS to exit
    
```

```

Edit Tool#1
Arrow keys to scroll
Press TOOLS to exit
    
```

```

T#1          S#1  /24
Length          60.000
Gags          00011
Press TOOLS for next
    
```

Press **”TOOLS”** key,

```

T#1          S#1  /24
Repeat          2
Exit editing    <
TOOLS-next BKSP-Prev
    
```

Choose **Exit editing** command and press the **“ENTER”** key

```

Tool#1
Save
Save as        <
TOOLS-next BKSP-Prev
    
```

Press **”TOOLS”** key,

```

Tool#1
Delete Tool    <
TOOLS-next BKSP-Prev
    
```

Press **“ENTER”** key.

```

Delete Tool#1
  Press 1 to confirm
Another key to abort

```

Press “1” key.

```

Tool#1           Deleted

```

4.9 HOW TO ACTIVATE A TOOL

NOTE: Make sure that the **PROGRAMMING “LOCKED / UNLOCKED”** key switch is in “**Unlocked**” position and **FEED STATUS** screen is displayed. If the current screen is not **FEED STATUS** one then press the “**OPER**” key to bring it up.

Press “**TOOLS**” key, position the pointer next to Activate tool command and press the “**ENTER**” key.

```

Edit Tool
Activate Tool      <
Create New
Press TOOLS to exit

```

```

Activate Tool#
Arrow keys to scroll
Press TOOLS to exit

```

Enter the desired tool number or select it from the tool list using “**↑**” and “**↓**” keys and press the “**ENTER**” key again.

```

Activate #1234567
Arrow keys to scroll
Press TOOLS to exit

```

```

Tool Activated

```

4.10 HOW TO EDIT “SETUP” PARAMETERS

NOTE: Make sure that the **PROGRAMMING “LOCKED / UNLOCKED”** key switch is in “**Unlocked**” position and **FEED STATUS** screen is displayed. If the current screen is not **FEED STATUS** one then press the “**OPER**” key to bring it up.

Press “**SETUP**” key **three times**, position cursor next to desired parameter, enter in new value, and press the “**ENTER**” key.

```
Speed      72.00
Accel     400.00
Decel     400.00
Press SETUP for next
```

Press “**OPER**” key if editing is done or press “**SETUP**” key to open next screen.

4.11 HOW TO EDIT COUNT FROM OPERATOR SCREEN

Locate the **OPERATOR** screen, position cursor next to the **Count**, enter new value, and press the “**ENTER**” key. Enter “**0**” for continuous run.

```
Count      Cont.Run
Step Status
Press OPER to exit
```

5 OPERATING THE ULTRA EDGE SERVO FEED

5.1 PROGRAMMING

There is no need to program anything if the **Tool Storage** is properly set up. It is only matter of activating the needed tool, although the **OPERATOR** screen allows the Operator to edit a batch count that overrides the stored tool **Count** and will be active until the current tool is reactivated or another tool is activated.

Activate tool is the only command that is Operator accessible and can be executed only when the feed is not cycling.

5.2 “AUTO / MANUAL” MODE

Auto Mode is used for production running of the *UltraAdvantage Servo Roll Feed*. The feed is in the **Manual** mode after powering it up, it can be put in **Auto** mode by pressing **Cycle Start** button and back to the **Manual** mode by pressing **Cycle Stop** button.

The feed remembers a sequential step it gets stopped at, so when the **Cycle Start** button is pressed it resumes feeding from that point.

During **Manual** mode, the feeder can be jogged infinitely in either direction. After the **Cycle Start** button is pressed, the jog buttons are inactive, and the feeding of the strip follows the signals from the process machine.

5.2.1 PRESS APPLICATION

In the **Press** application the feed is controlled by a **Feed** cam signal and a **Reset** cam signal. The **Gag** outputs are activated/deactivated at the beginning of every **Feed** signal, so the activation/deactivation of the tools happens during the material feeding.

In applications with a cutting device where a backup move is required, the **cutter bottom position** sensor must be installed and wired to the control.

If a value is assigned for the **Back Length** parameter, the feed will move the material back for the distance that equals the **Back Length** if:

- the **cutter bottom position** sensor turns on between the end of the **Feed Cam** signal and the beginning of the **Reset Cam** signal; and

- the current step carries only one **Gag** output assigned to the cutting device. If more than one **Gag** output gets fired, the feed will not make a backup move – it will proceed to the next step displaying an error message that will remain on the screen until Operator clears it out by pressing “**ENTER**” key:

```

T#1
      Auto Mode
Step 32 Backup error
      Press a Mode Key

```

The **Back Length** is compensated on the next move, so it has no affect on the **Length** parameter.

During “**Auto**” mode, the control keeps check on synchronization of the feeder and the press. If the feeder does not complete the index move within the feed cam window, the message “**SYNC FAULT**” displays.

The *Ultra Edge Sequential* has 2 modes of automatic cycling. The feeder can operate in **Single Stroke** or **Continuous** modes. The mode is selected through an input to the feed controller. The Press controls single stroke/continuous mode switch should be interfaced to that input for proper operation. During single stroke mode operation, the “**Permit Press**” relay is activated upon the completion of each feed index.

The “**Permit Press**” relay remains activated until the reset cam signal turns on, or for the duration of the **Dwell**, if the **Dwell** parameter is programmed. The “**Permit Press**” relay may be used to signal the press when to initiate the single stroke cycle. The automatic cycling of the press and feeder will continue until the batch is completed, the cycle is stopped by the Operator, or an error occurs.

During “**Continuous Press**” mode, the “**Permit Press**” relay turns on at the beginning of the indexing.

The “**Permit Press**” relay remains activated until the automatic cycling is stopped by either “**Cycle Stop**” button, “**Batch Complete**” internal command, “**Sync Fault**” or any other drive related error. Under “**Cycle Stop**” or “**Batch Complete**” stopping, the output will turn off at the beginning of the Feed Cam Signal. This should allow the press to stop near the top of the stroke. Under “**Sync Fault**” or other drive fault conditions, the “**Permit Press**” relay will turn off immediately upon detection of the error.

5.2.2 PUNCH (PUNCHING BENCH / MULTIPLE PRESSES) APPLICATION

In the **Punch** (punching bench or multiple presses) application the feed is controlled only by the **Feed** signal, while a wire jumper must be placed across the **Reset** signal. The **Feed** signal is a series of the punch/press **top position** sensors/cam switches. When the material is fed, the **Gag** outputs are activated for the duration of **Dwell** time (must be long enough for the punches to go all the way down or the press to pass BDC-bottom dead center, meaning the press is running in its Single Stroke mode).

In applications with a cutting device, where backup move is required, the **cutter top** and **bottom position** sensors must be installed and wired to the control.

If any value is assigned for the **Back Length** parameter, the feed will move material back for the distance that equals the **Back Length** when the **cutter bottom position** sensor turns on during **Dwell** time and the **Feed** signal remains on.

The **Back Length** is compensated on the next move, so it has no affect on the **Length** parameter.

5.3 TROUBLESHOOTING GUIDE

The chart that follows contains the most frequently encountered issues.

Symptom	Cause or Remedy
No power indication when Power On button is pressed	<ol style="list-style-type: none"> 1. Check the main power supply for proper voltage. 2. Check the supply circuit breakers. 3. Verify that the main disconnect switch is on. 4. Verify that the E-Stop is not engaged (E-Stop Loop closed.) 5. Check the bulb in Power On push button.
No display on power up	<ol style="list-style-type: none"> 6. Check the cabling connection between display and the servo drive. 7. Check 5 VDC power supply.
Feed will not jog	<ol style="list-style-type: none"> 8. Check if IN POSITION indicator is off. Check parameters. Check drive for Error Codes. 9. Check the FAULT in display i.e. DRIVE FAULT # ABC. Check for Error descriptions. See Section 5.2 of the "Ultra 5000 Intelligent Positioning Drives" Installation Manual.
Power On indicator is lit. Feed will not operate.	<ol style="list-style-type: none"> 10. Check that the IN POSITION indicator is lit. If not, check parameters. 11. Check that the Error message is in the Display. If so, check error description in Section 5.4 12. Press the Power On button, release the Power On button, and then try to jog feeder.
Feed will not accept new " Feed Length " or other parameters	<ol style="list-style-type: none"> 13. Make sure that the feed is not in "Auto" Mode. 14. Reset the Feed.
Inaccurate feeding	<ol style="list-style-type: none"> 15. Adjust the rolls for the correct material thickness; the tip of the roll release lever must have a small amount of play/wobble – approx. 1/16". 16. Adjust the spring pressure (Do not bottom springs. Catastrophic damage can occur.) 17. Confirm if the rolls are slipping on the strip. Remove oil from the feed rolls, reduce acceleration, check the tool for binding/slugs, etc. 18. Adjust the upstream equipment if the upstream equipment not providing adequate/consistent free loop. 19. Check the roll release for the proper settings
Feed runs backwards	<ol style="list-style-type: none"> 20. Verify that the direction parameter has been set properly (CW or CCW).
Drive Fault	<p>This is a generic display prompt indicating a fault on the Servo Drive.</p> <ol style="list-style-type: none"> 21. Look at the diagnostic display on the Servo Drive. The cause of the fault can be determined by reading the Error Code. 22. Refer to Sections 5.4. This fault condition can be caused by any one of the errors in the lists. 23. Check the Error Code first, then reset the Servo Drive by turning the power off, waiting 10 seconds, and then powering the Servo Drive back on. 24. Verify that the fault will not reset. Call the factory for assistance.

If the problem you are having does not appear in the above chart, or does appear in the chart, and you have questions about it, call the P/A Service Department for assistance. Please have your Model Number and Serial Number ready. However, it is advisable to check the basics before calling to be sure the problem is not something simple that may have been overlooked.

5.4 ERROR CODES

Error Code	Problem or Symptom	Possible Cause(s)	Action/Solution
04	Motor Over Temperature	Motor thermostat trips due to: High motor ambient temperature, and/or Excessive RMS torque. Bad encoder cable or connection.	Operate within (not above) the continuous torque rating for the ambient temperature (40'C maximum). Lower the ambient temperature to increase motor cooling. Check the encoder cable connections. Check the encoder cable for continuity.
05	IPM Fault	Motor cables shorted. Motor winding shorted internally. Ultra5000 Servo drive temperature too high.	Verify continuity of motor power cable and connector. Check for short on U,V,W and Gnd windings of the motor. Check for clogged vents or defective fan. Ensure cooling is not restricted by insufficient space around the unit.
		Operation above continuous power rating. Ultra5000 has a bad IPM, output short circuit, or over current.	Verify ambient temperature is not too high (above 60' C). Operate within the continuous power rating. Replace Ultra5000.
09	Bus Under Voltage	Low AC line/AC power input. 100 VAC minimum for safe Ultra5000 operation.	Verify voltage level of the incoming AC power. Check AC power source for glitches or line drop (below 90V AC). Install an uninterruptible power supply (UPS) of the proper size on your AC input.
10	Bus Over Voltage	Excessive regeneration of power. When the motor is driven by an external mechanical power source, it may regenerate too much peak energy through the Ultra5000's power supply. The system faults to save itself from an overload. Excessive AC input voltage. Output short circuit. Motor cabling wires shorted together. Internal motor winding short circuit.	Lower the deceleration rate. Verify input is below 264V AC. Check for shorts. Check for shorts. Check for shorts.
11	Illegal Hall State	Incorrect phasing. Bad connections.	Check cables and connections.
20	Motor Encoder State Error	The motor encoder encountered an illegal transition.	Replace the motor. Check the Pilot Release settings. Route the cables away from potential noise sources. Check the system grounds.
		Bad encoder.	Replace motor.

Error Code	Problem or Symptom	Possible Cause(s)	Action/Solution
21	Auxiliary Encoder state Error	The auxiliary encoder encountered an illegal transition.	Use shielded cables with twisted pair wires. Route the encoder cable away from potential noise sources. Bad encoder - replace motor. Check the ground connections.
22	Motor Thermal Protection Fault	The internal filter protecting the motor from overheating has tripped.	Reduce acceleration rates. Reduce duty cycle (“ On/Off ”) of feed indexes. Increase time permitted for motion. (Check cabling.)
23	IPM Thermal Protection Fault	The internal filter protecting the IPM at slow speed has tripped.	Reduce acceleration rates. Reduce duty cycle (“ On/Off ”) of feed indexes. Increase time permitted for motion.
24	Excess velocity Error	Velocity error limit was exceeded	Increase time or size of allowable error. Reduce acceleration. Check tuning.
25-99			Call P/A service department

The servo drive module has built in diagnostics. The current status of the drive is always shown on the 7-segment **LED STATUS** display, located on the front of the drive. The normal state of the **LED** is to actively cycle its edge segments and an illuminated decimal point that indicates +5 volts. If an error occurs, the **LED** displays flashing letter **E** followed by a two-digit error code, one digit at a time.

Errors can also be viewed on a Personal Computer screen using **Ultraware** software package available upon request.

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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