Machine Controls Training

Engineering and Maintenance Support of Integrated Control Systems for the Roll Forming Industry

AMS CONTROLS

Controller Hardware

- Page 8

XL200 Series Hardware

- Rugged industrial controller
- 10.4” extended temperature range LCD and touch-screen
- Full optical isolation for outstanding noise immunity
- High speed DSP coprocessor for motion control algorithms
- 24 digital outputs with 3.5 amp continuous current
- 24 digital inputs
- 4 incremental encoder inputs
- 2 12-bit analog outputs
- SERCOS digital servo drive support
- 4 high-speed communication ports

XL200 Series Hardware

- No LCD Hardware with remote display
- Sinking and Sourcing I/O
- Bar Code Scanner port for connecting a Serial Based Bar Code Scanner
- DVI Port for Remote Display
- VGA, Mouse, and Keyboard Port for External Devices
- 10mb/s Ethernet Port for Eclipse

Additional Controllers

- MP465

- MP300

AMS CONTROLS

XL200 Series Hardware

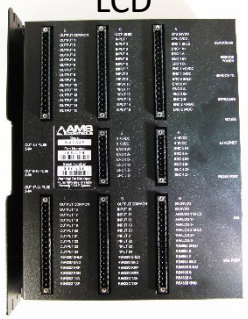
Single Remote Display Overview

Main XL200 w/ LCD

DVI Cable
20 meter max

12.1” Remote Display

Or
Main XL200 wo/ LCD



XL200 Series Hardware

Multiple Remote Display Overview

Main XL200 w/ LCD

DVI Cable
20 meter max

DVI Cable
20 meter max

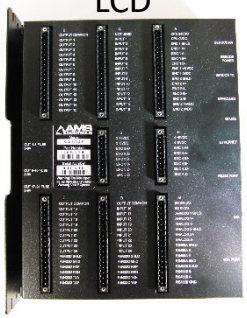
DVI Cable
20 meter max

12.1” Remote Display

DVI Cable
20 meter max

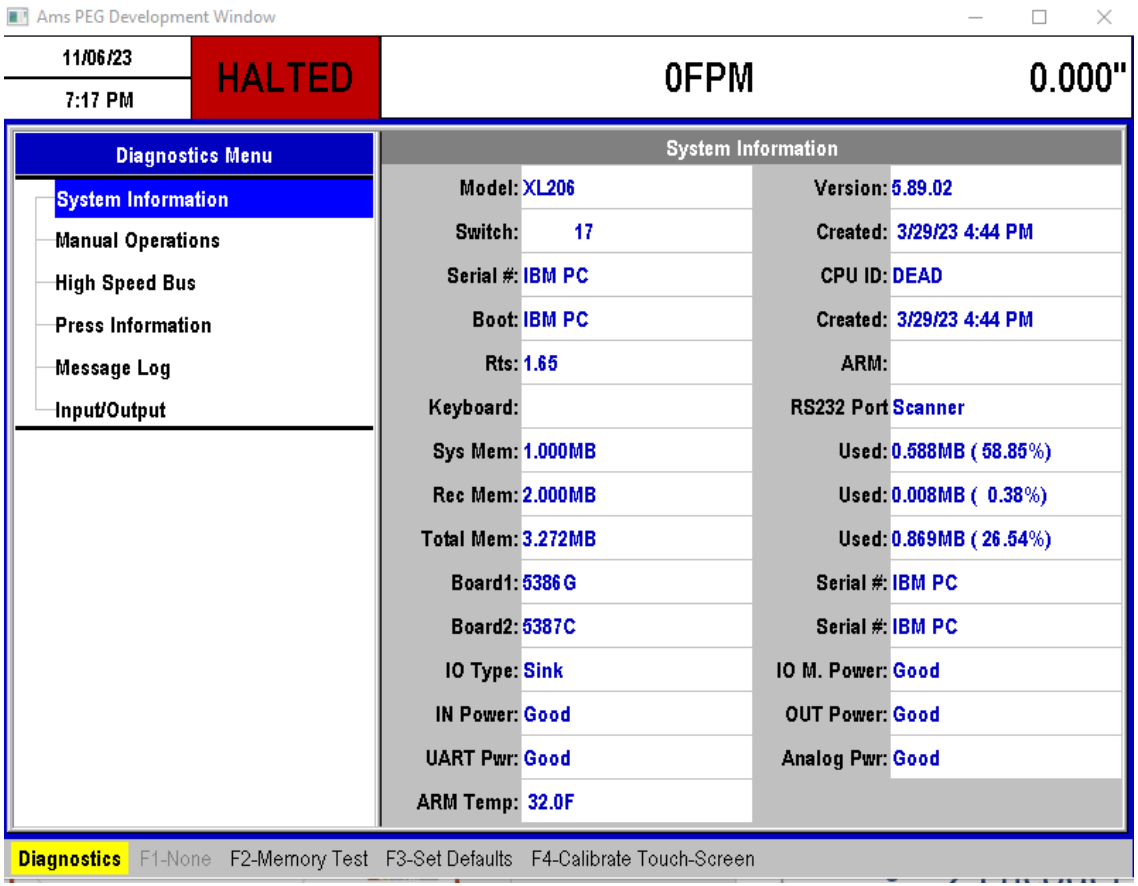
12.1” Remote Display

Or
Main XL200 wo/ LCD



12.1” Remote Display

System Information



Configuring the Controller

- Not a PLC
- Controllers are customizable for each machine

1. Choose Software
2. Configure Dip Switches
3. Set Up Parameters

Flash Programming the XL200

- Obtain Firmware from AMS Controls
- Use Flash Wizard to “Flash Program” the controller

Set the “Configuration” switches

- Press the “Setup” key as the controller powers up
- Set “Configuration” switches according to the machine configuration

XL200 Series Standard Open Loop Switch Settings Version 2.00 & 3.00
Updated: January 10, 2018

Models: XL200, XL200H

Switch #	OFF	ON
1	Feed-to-Stop Shear	Non-Stop Shear
2	Shear Die Boost Output	Shear Up Output
3	Single-Speed Shear	Two-Speed Shear
4	Disable Auto Crop	Enable Auto Crop
5	Feed-to-Stop Punch	Non-Stop Punch
6	Punch Die Boost Output	Punch Up Output
7	Single-Speed Punch	Two-Speed Punch
8	NOT USED – MUST BE OFF	NOT USED – MUST BE OFF
9	CRT Disabled	CRT Enabled
10	NOT USED – MUST BE OFF	NOT USED – MUST BE OFF

XL200 Series Software Models

XL200

- Open Loop Controller
- Capable of Controlling a Single Shear and Single Punch
- Feed to Stop or Flying Presses

XL200CL

- Closed Loop Controller
- Capable of Controlling a Single Shear and Single Punch
- Feed to Stop can control 2 Presses in CL
- Flying Press mode can only control 1 Press in CL, the other Press will be OL

AMS CONTROLS

XL200 Series Software Models

XL202

- Open Loop Controller
- Capable of Controlling a Single Press with 1 Gag
- Feed to Stop or Flying Presses

XL202CL

- Closed Loop Controller
- Capable of Controlling a Single Press with 1 Gag
- Feed to Stop Only

XL200 Series Software Models

XL202CLF

- Closed Loop Controller
- Capable of Controlling a Single Press with 1 Gag
- Flying Press Only

XL200 Series Software Models

XL206

- Open Loop Controller
- Capable of Controlling a Single Press with 5 Gags, or Six Presses, or any combination thereof
- Feed to Stop or Flying Presses

XL206CL

- Closed Loop Controller
- Capable of Controlling a Single Press with 5 Gags, or Six Presses, or any combination thereof
- Feed to Stop Only

XL200 Series Software Models

XL206CLF

- Closed Loop Controller
- Capable of Controlling a Single Press with 5 Gags, or Six Presses, or any combination thereof
- Flying Press Only

XL200 Series Software Models

XL212

- Open Loop Controller
- Capable of Controlling a Single Press with 11 Gags, or 12 Presses, or any combination thereof
- Feed to Stop or Flying Presses

XL212CL

- Closed Loop Controller
- Capable of Controlling a Single Press with 11 Gags, or 12 Presses, or any combination thereof
- Feed to Stop Only

AMS CONTROLS

XL200 Series Software Models

XL212CLF

- Closed Loop Controller
- Capable of Controlling a Single Press with 11 Gags, or 12 Presses, or any combination thereof
- Flying Press Only

XL200 Series Software Models

XL266

- Open Loop Controller
- Originally Designed for the Schlebach Quadro Machine
- Includes Special Programming for Press Up Complete Switches
- Capable of Controlling 5 presses
- Feed to Stop only

XL200 Series Software Models

XL270

- Open Loop Controller
- Special Parameterizations for a Tile Machine
- Capable of Controlling a Single Shear and 2 Forming Presses
- Feed to Stop only

XL270CL

- Closed Loop Controller
- Special Parameterizations for a Tile Machine
- Capable of Controlling a Single Shear and 2 Forming Presses
- Feed to Stop only

AMS CONTROLS

XL200 Series Software Models

XL244CL

- Closed Loop Controller
- Capable of operating one press with four gags, five presses with no gags, or any combination of presses and gags totaling five.
- Two of the presses can be Closed Loop.
- Flying Press Only

XL200 Series Software Models

XL200CL-RE

- Closed Loop Controller
- Capable of Controlling a Single Press axis of the following type:
  - Linear Die Accelerator
  - Eccentric Press
  - Rotary Press
- Flying Press Only

XL200 Series Software Models

XL200CL-MDA2

- Closed Loop Controller
- Dual Closed Loop Linear Die Accelerator Controller
- Flying Press Only

XL200CL-MRE2

- Closed Loop Controller
- Capable of Controlling 2 Press Axis of the following type:
  - Linear Die Accelerator
  - Eccentric Press
  - Rotary Press
- Flying Presses Only

XL200 Series Software Models

XL212CL-MHA

- Closed Loop Controller
- Single Axis Die Accelerator Controller
- Supports a Closed Loop Flying Die line that can fire on multiple targets during die stroke without returning home between targets.

XL212CL-MHA2

- Closed Loop Controller
- Dual Axis Die Accelerator Controller
- Supports a Closed Loop Flying Die line that can fire on multiple targets during die stroke without returning home between targets.

XL200 Series Software Models

XL212CL-SGF

- Closed Loop Controller
- Designed to Operate a Machine that is Stick Fed Pre-Cut Blanks of Material
- Grip Feed or Feed Roll Driven
- Part Optimization based on Stick Length
- Auto Measurement of Stick Length Using Sensors
- Feed to Stop Only

XL200 Series Software Models

XL200-SPD

- Open Loop Controller
- Designed to Operate a Machine that Produces Round Spiral Duct
- Feed to Stop Only

XL200 Series Software Options

Print on Part (P)

- Ability to Integrate with a Print-on-Part Printer
  - Ink Jet
  - Label Applicator
  - Label Printer
- Standard Message from the Controller
- Fully Customizable Message when Eclipse is used.
- Integration Kit must be purchased from AMS Controls for Support Printers
- Full List of Support Printer Models can be found at www.AMSControls.com

XL200 Series Software Options

Bundle Ticket Printer (B)

- Ability to Integrate with a Bundle Label Printer for Labelling Bundles or Printing Coil Tags
- Standard Label Format from the Controller
- Fully Customizable Label when Eclipse is used
- Integration Kit must be purchased from AMS Controls for Support Printers
- Full List of Support Printer Models can be found at www.AMSControls.com

XL200 Series Software Options

Extended Macro (M)_

- Extends the Range in which Macro Patterns can be created from 50 to 350 available Macros.

XL200 Series Software Options

Auxiliary/Slave Controller (S)

- Ability to Communicate with a Downstream Set of Controllers called “Slave” Controllers
- Can be used for Multi-Axis Slaves (SL325), Additional Closed Loop Die Accelerator Slaves (SL301HCL), or Additional Open Loop Axis Slaves (SL301H)

XL200 Series Software Options

Analog (AA)

- This option allows the operator to vary line speeds automatically depending on the length of the part being produced.
- Analog output is proportional to part length for flying die lines.
- Allows full control of speed and direction for open loop feed-to-stop lines.

XL200 Series Software Options

Alternating Press (L)

- Allows two presses to be defined as one press. The controller will automatically distribute press targets between the two presses.
- Often used on stud lines that run at high speeds to avoid overlapping punches.

XL200 Series Software Options

Brake and Hump (U)

- Special outputs for controlling machines that form a hump of material between the feed rolls and the shear.

XL200 Series Software Options

Hydraulic (Y)

- Special Parameters for controlling machines that utilize servo valve driven hydraulic cylinders for flying cutoff presses.
- Dither and Deadband Parameters

XL200 Series Software Options

Multi-Axis (X)

- Support for Punches that operate in both the X and Y Axis
- Support for Machine Setup Axis controlled via a Product Code (Machine Setup) or Punch Pattern (Punch Tooling)
- Y-Axis Movements can be controlled via:
  - Sercos via Servo Drives (up to 7 Only)
  - PLC Controlled via Modbus
  - SL325 Slave Controllers either Open Loop or Closed Loop

XL200 Series Software Options

PLC Interface (I)

- PLC integration using Modbus Protocol. Most I/O can be memory mapped to PLC, high level data can be published from controller to PLC.
- Data Available Types:
  - Inputs/Outputs
  - Additional Gags (Unlimited)
  - High Level Data
    - Current and Next Order, Material, Product Code
    - Qty, Length, Pattern

XL200 Series Software Options

PLC Interface (I)

- Messaging and E-stop Conditions from the PLC
- Delay and Scrap Code Publishing
- Full Y-Axis Control including Jogging
- Die Accelerator Position Control for Die Changeovers
- Remote PLC Tool Select for Manual Operations
- Speed Control of a Closed Loop Feed to Stop System

XL200 Series Software Options

Continuous Press (C)

- Support for a press that runs continuously often used in Stamping Operations
- Ability to position the material based on the Stroke Rate of the Press and Feed Angle
- Continuous on Demand will switch to Single Stroke on the fly for long moves

XL200 Series Software Options

Sercos (O)

- Ability to control a servo drive via the Sercos II.
- Digital control of the drive. No analog signals and electrical noise to deal with

XL200 Series Software Options

Hole Detect (H)

- Provides hole detect functionality. The controller will detect the leading edge of a piece of material, detect a single hole, or detect and count a series of holes.

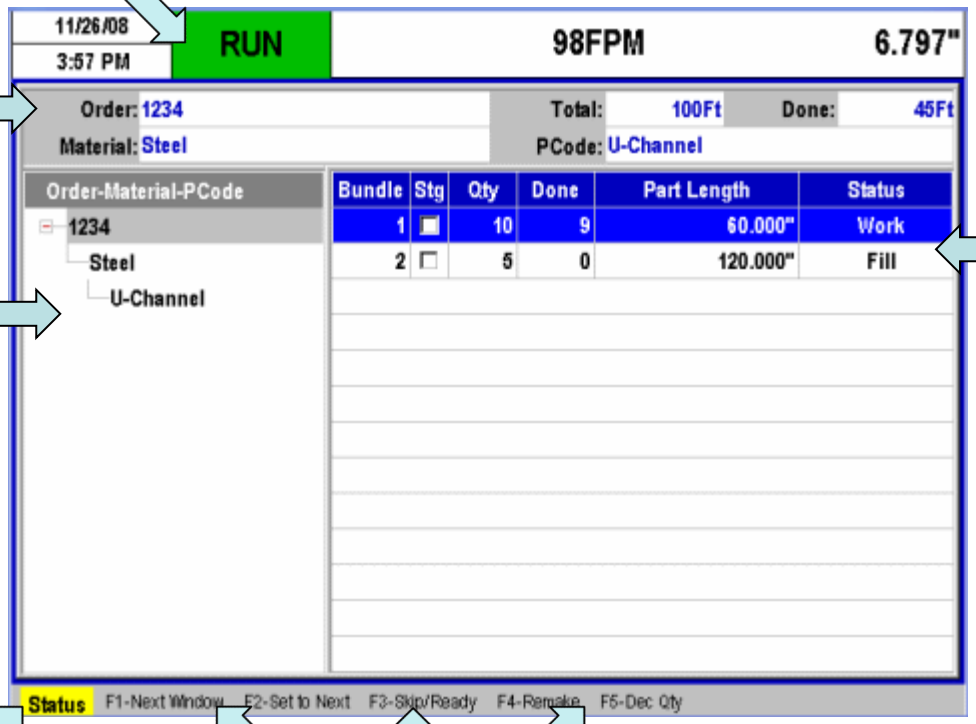
Machine Controller Basics

Status – Current Date/Time, Machine Status, Line Speed, Length Past Shear

Current Order Status

Order Information

Remaining Footage



Order List

Order Number

Raw Material

Tooling

Cutlist

Bundle

Quantity

Length

Status

Navigation

Similar to “Windows Start” button.

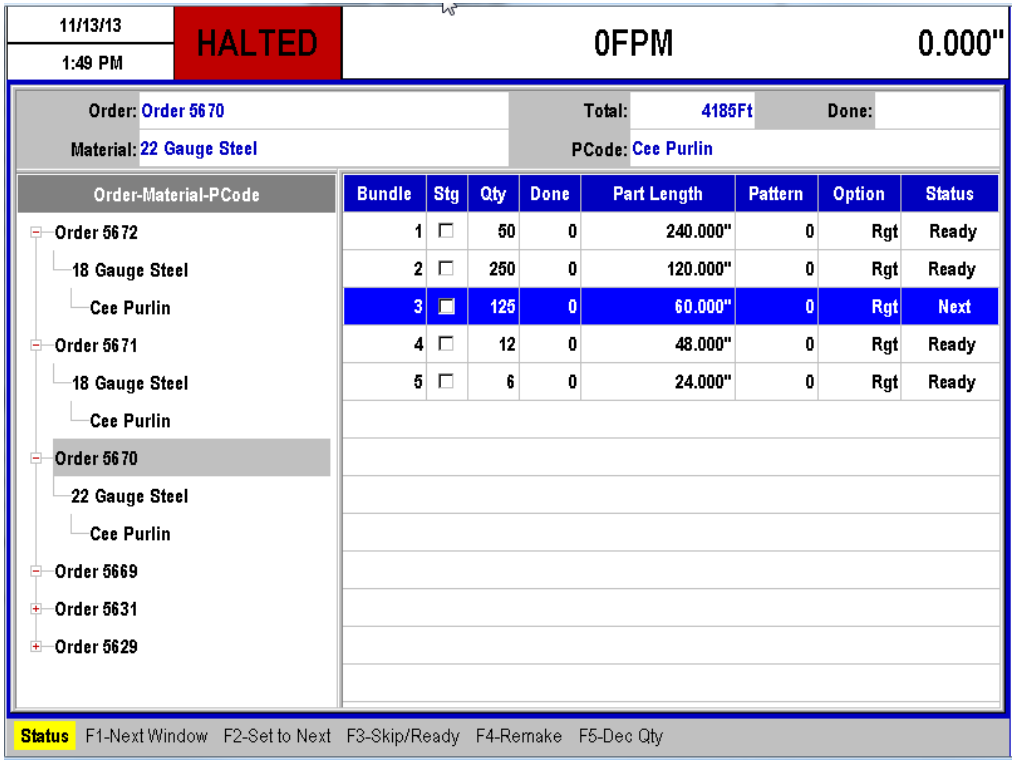
Menu-based Function Keys

Duplicates hotkey functions.

Functions change based on current menu selection.

Machine Controller Basics

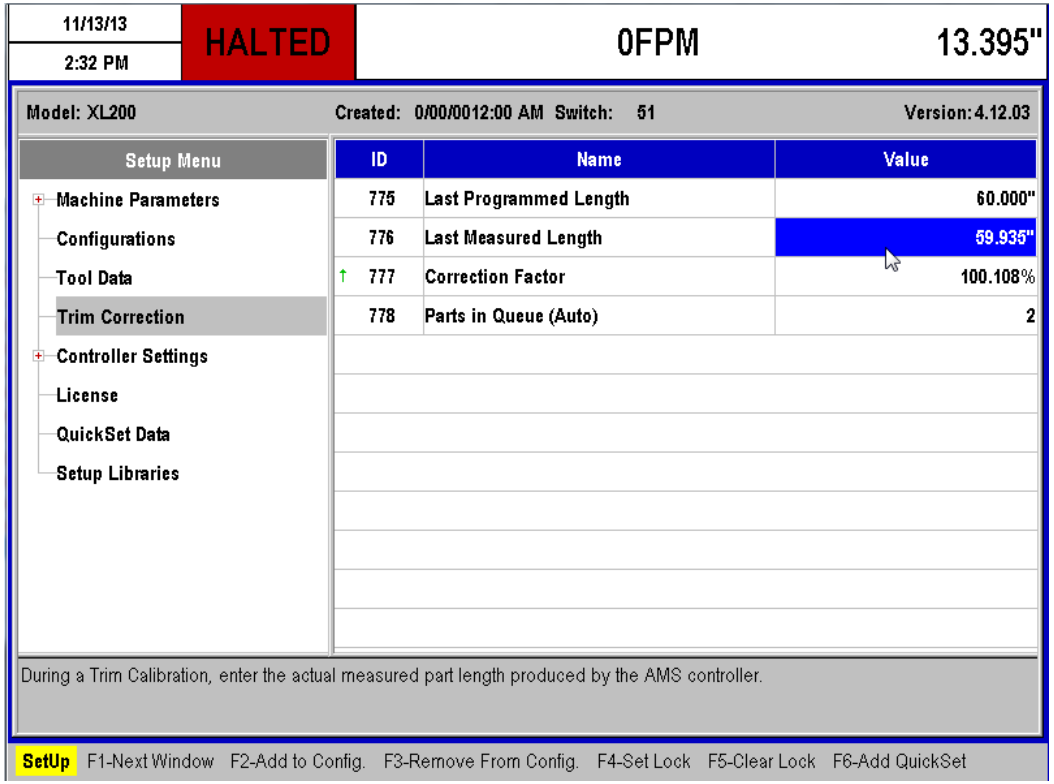
Production *Flows*



Length Calibration

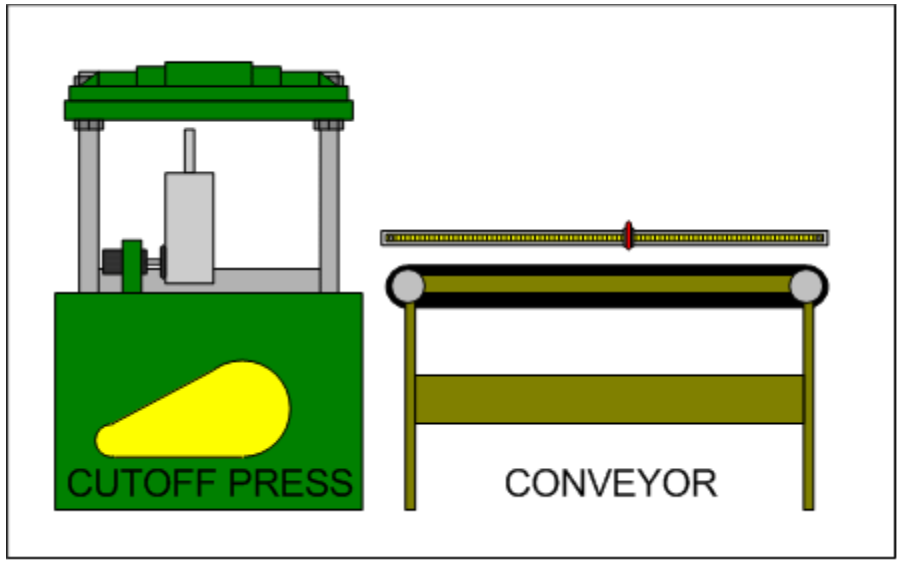
On-board Length Calibration

- Calibration corrects consistent error, *not* variance.
- Calibration is required due to encoder wheel measuring error.
- Operators enter length measured.
- Mind the queue!



The Part Queue

Allows on-the-fly changes without stopping the machine or producing scrap parts.



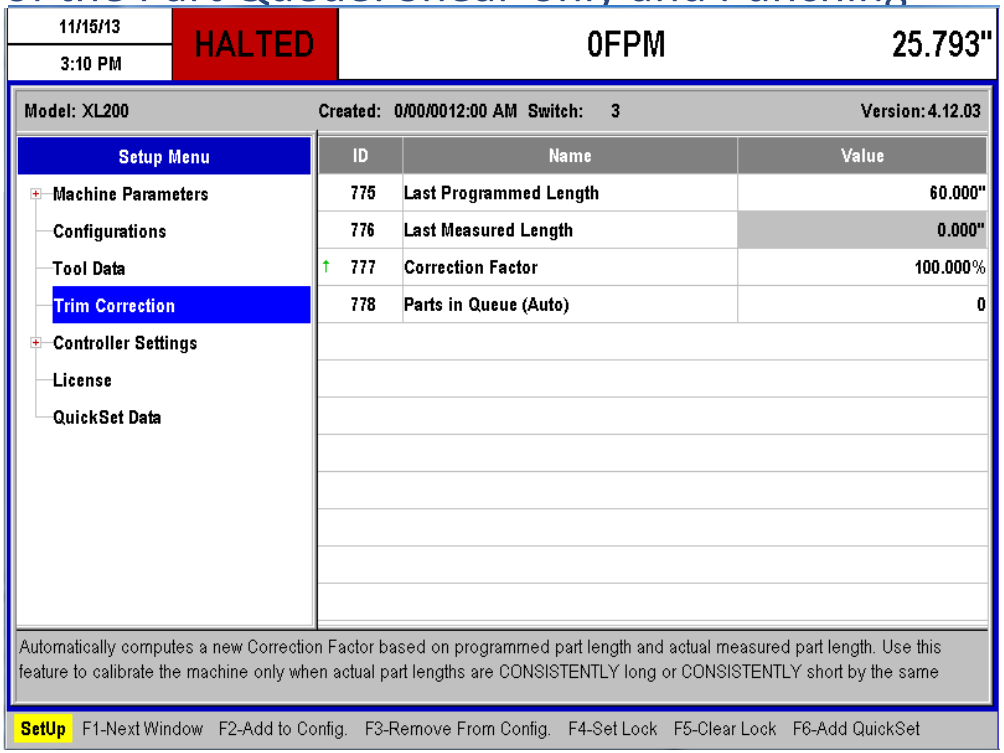
WAY BACK – in the “bad old days”

- Extremely precise lengths
- Lower production rates
- Inherent downtime and scrap

The Part Queue

Shear-only Part Queue

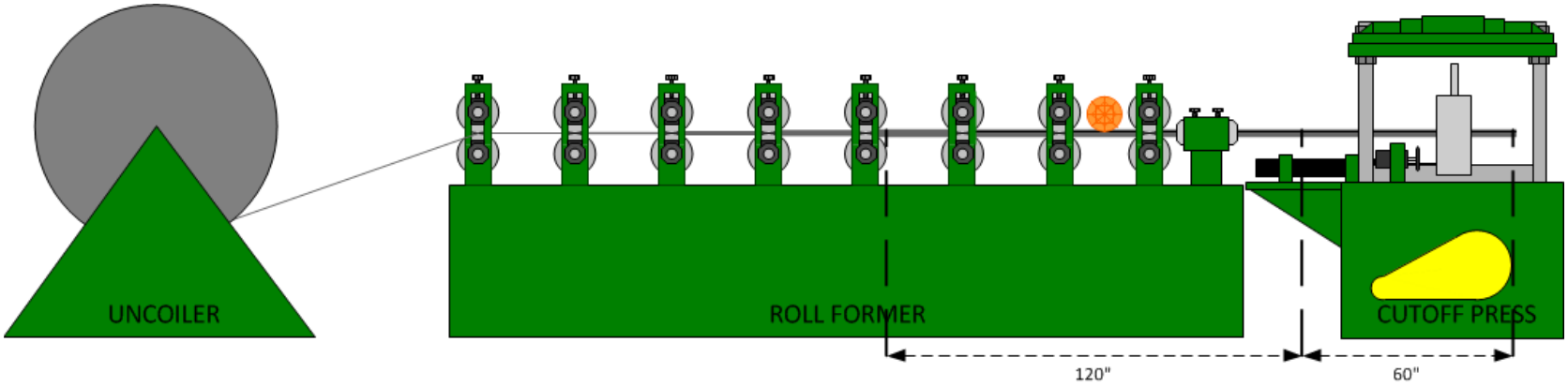
Two versions of the Part Queue: Shear-only and Punching

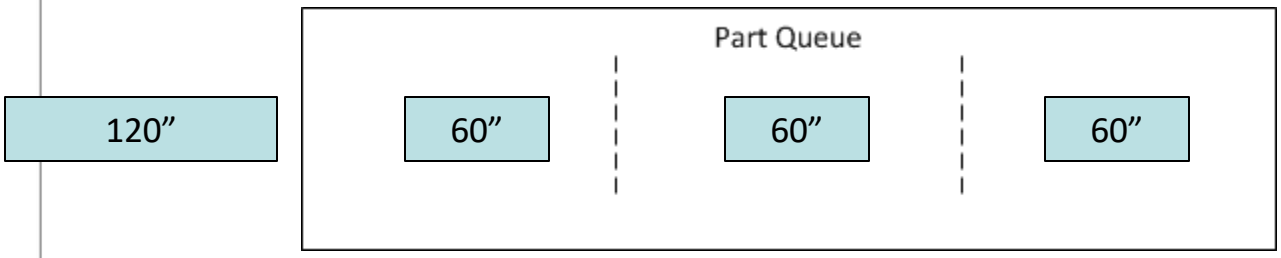


The Part Queue is “dumped” when the line is halted

The Part Queue

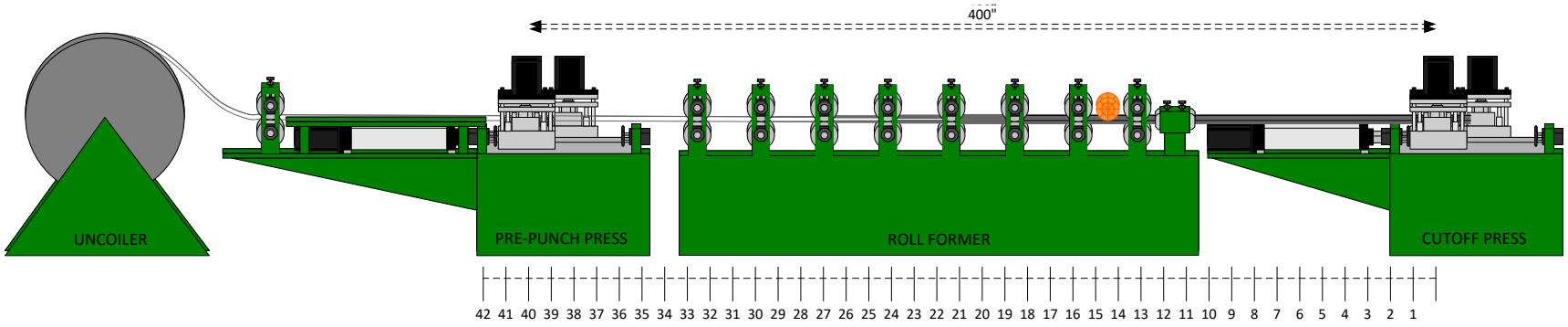
Shear-only Part Queue

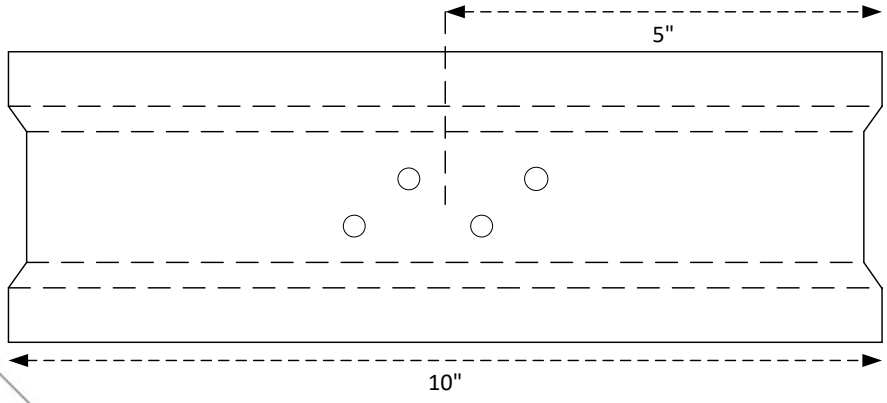




The Part Queue

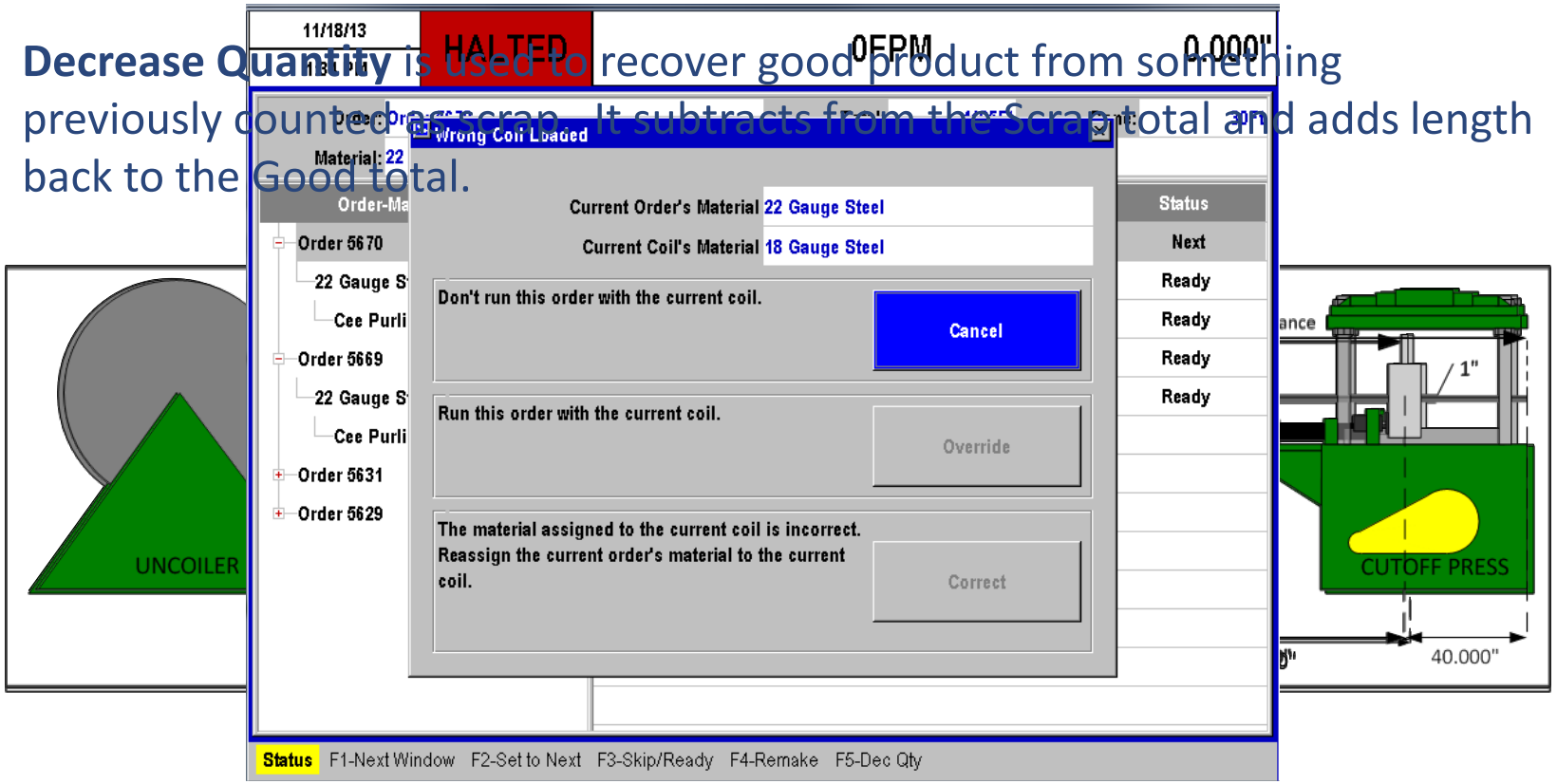
Punching Part Queue





Coil Change

Decrease Quantity is used to recover good product from something previously counted as scrap. It subtracts from the Scrap total and adds length back to the Good total.



Navigating the Controller

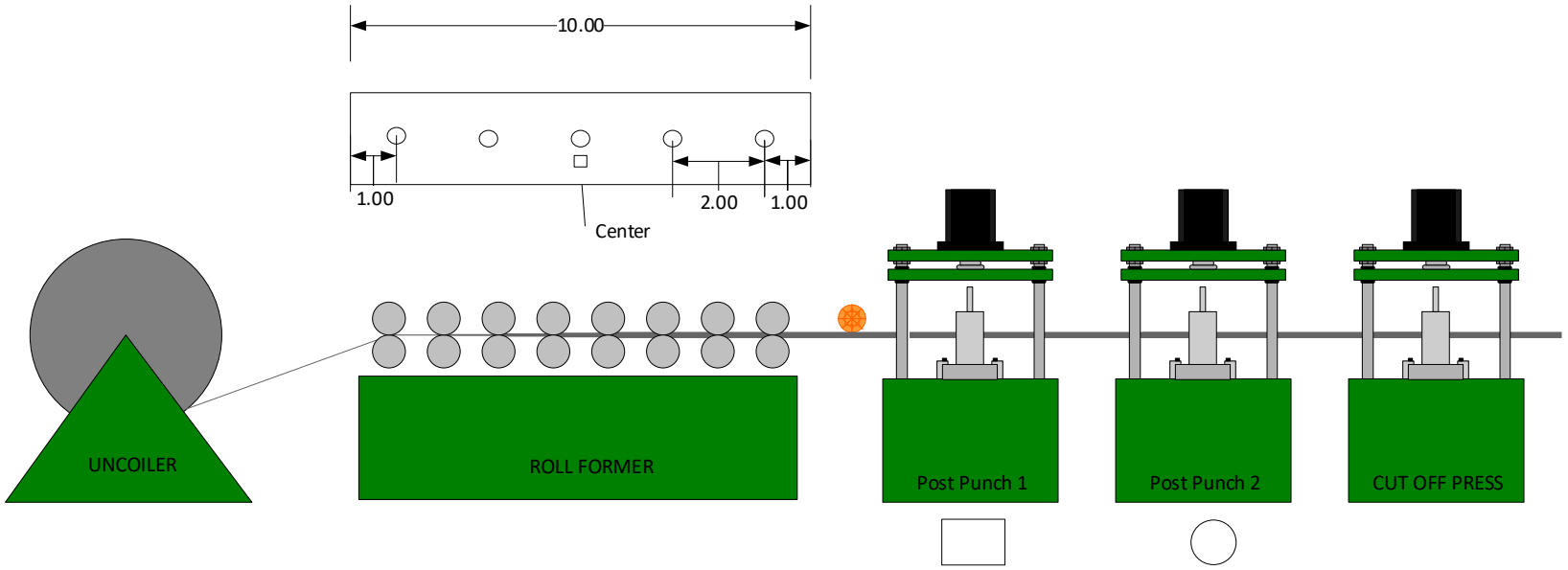
- Pages 20-24
- Program an Order
- Edit an Existing Order or Item
- Change the Sequence of Items Within an Order
- Remake an Item
- Delete a New or Done Order or Item
- Set the Next Line to Run
- Delete a Partially Completed Order or Item
- Increment Quantity During Run Mode

Navigating the Controller (Cont.)

- Pages 20-24
- Decrement Quantity (Identifying Scrapped Parts as Good Parts)
- Skip an Item to be Run
- View Coil Inventory
- View Inputs and Outputs
- Set the Time Clock
- Create a Pattern (Punching Only)
- Edit a Pattern (Punching Only)

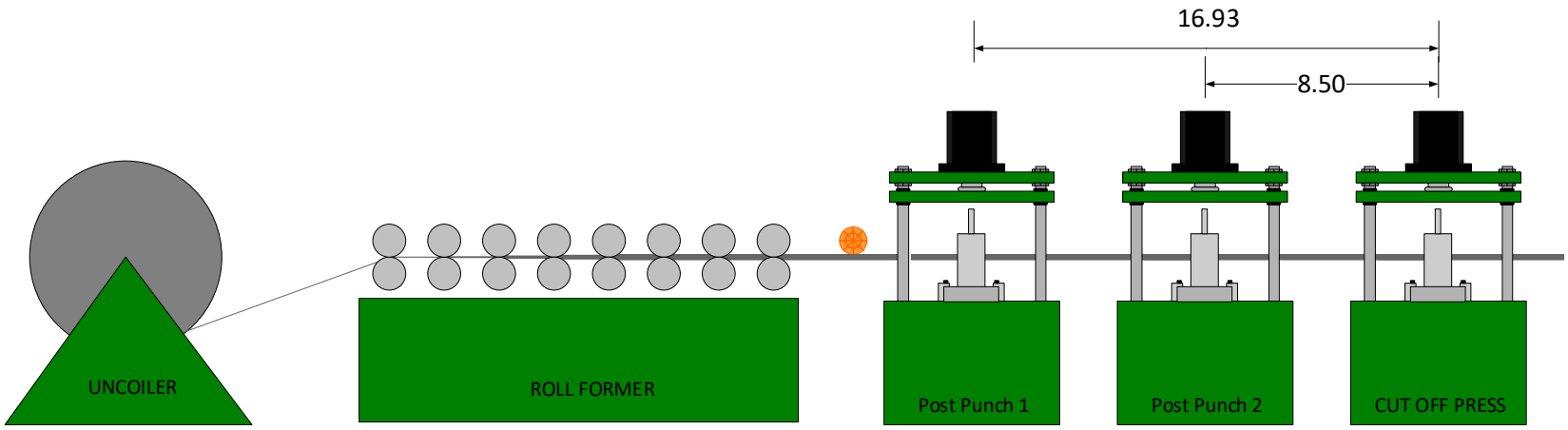
Punching Systems Overview

- Parts Programmed in Finished Dimensions
- Smart Punch Referencing for Expandable Patterns



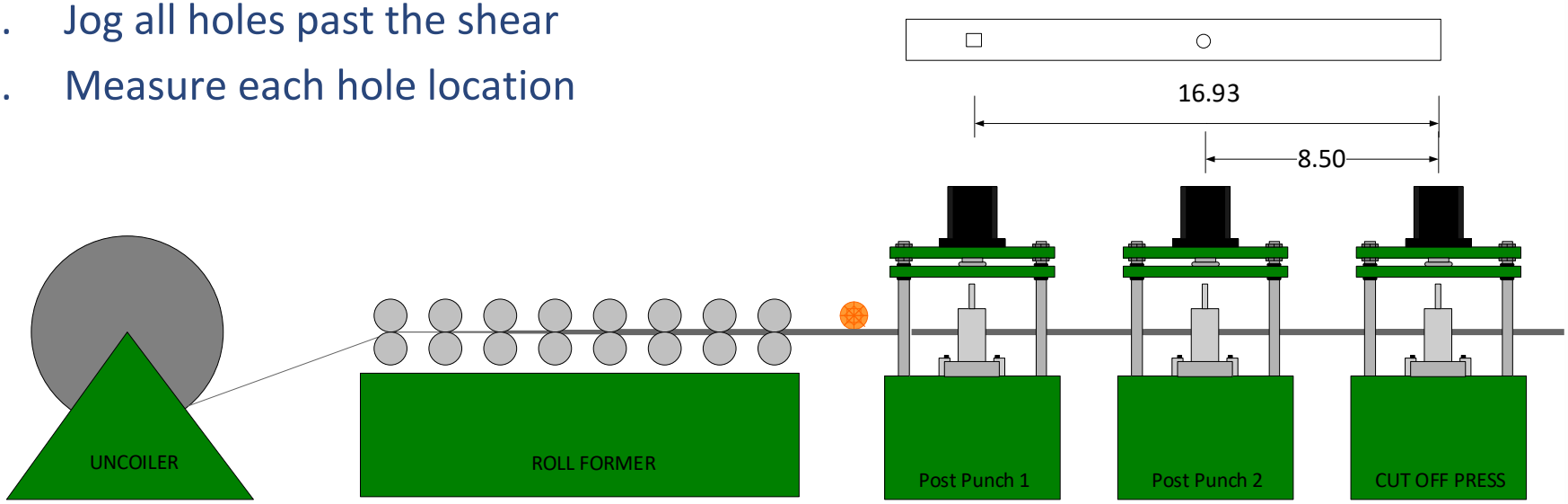
Tool Set Up - Steps

1. Measure accurate tool positions
2. Enter “Tool Data” into the controller



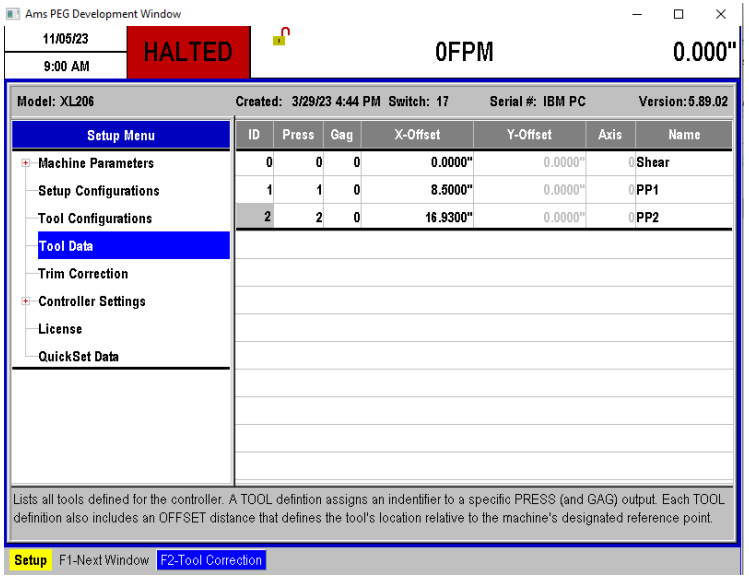
Tool Set Up – Step 1

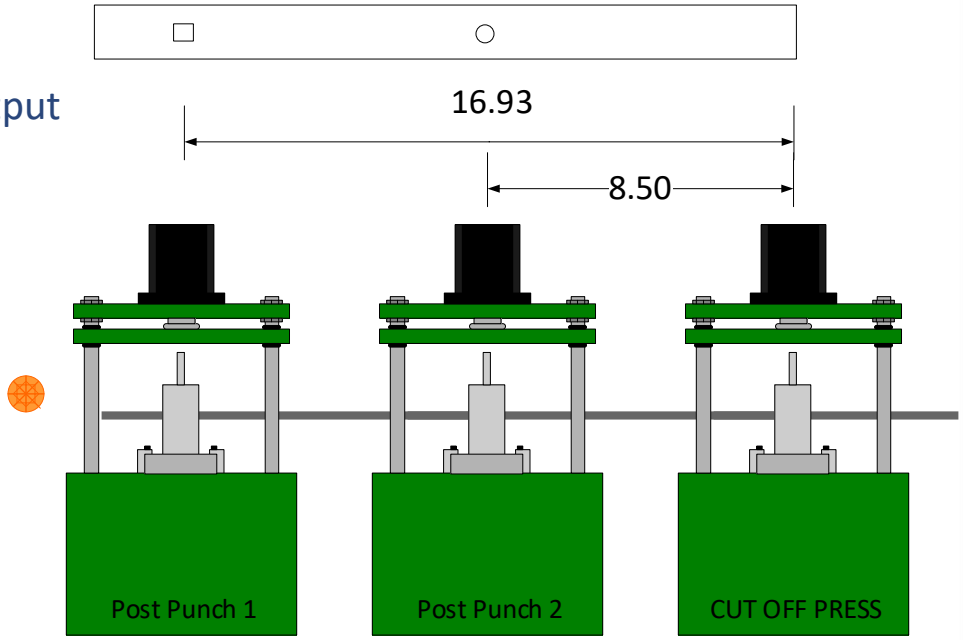
1. Load Material up to the Shear
2. Manually Fire the Shear
3. Manually Fire Each Press
4. Jog all holes past the shear
5. Measure each hole location



Tool Set Up – Step 2

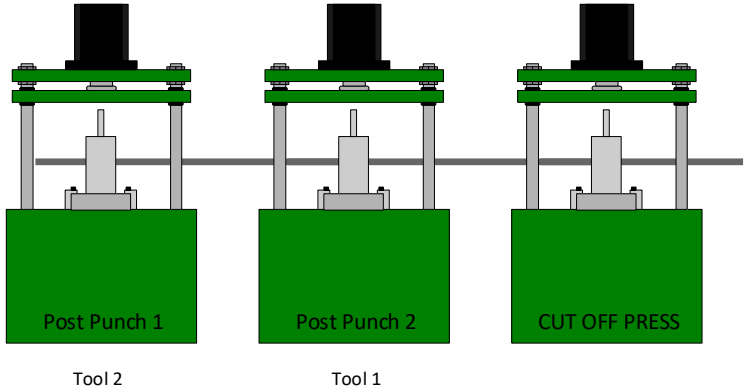
1. Assign a Tool Number
2. Identify the associated Press and Gag output
3. What is a Gag?

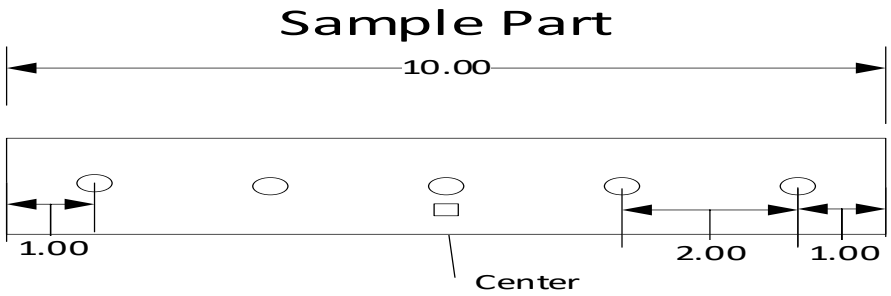




Creating a Punch Pattern– Overview

- Punch Patterns are Independent of Part Length

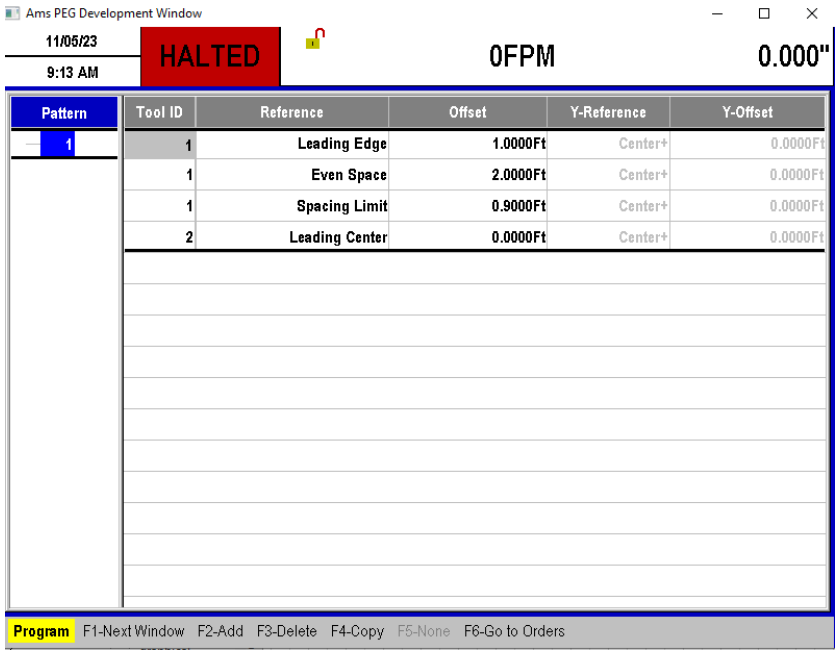


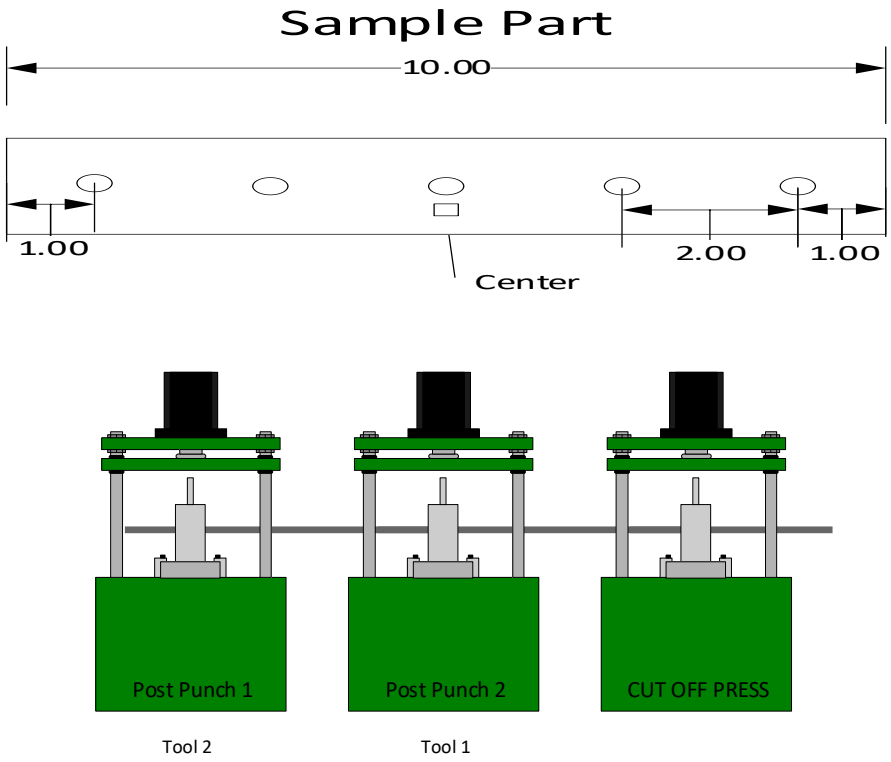


Creating a Punch Pattern– Punch References

- Leading Edge
- Training Edge
- Leading Center
- Trailing Center
- Even Space
- Spacing Limit
- Kerf Adjust
- Independent
- Proportional Min
- Proportional Max
- Proportional Limit

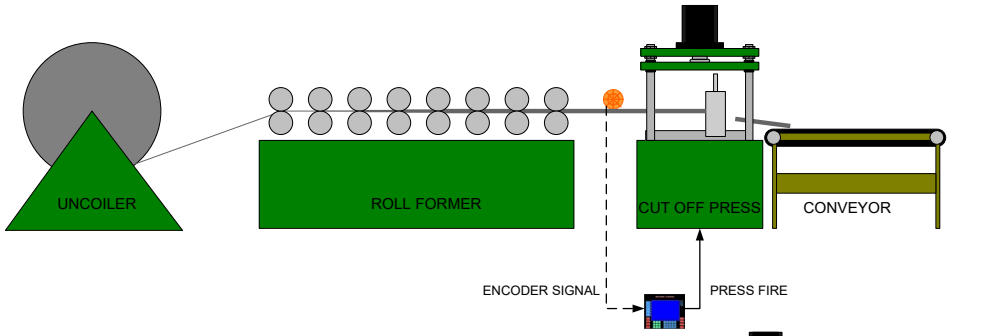
Creating a Punch Pattern

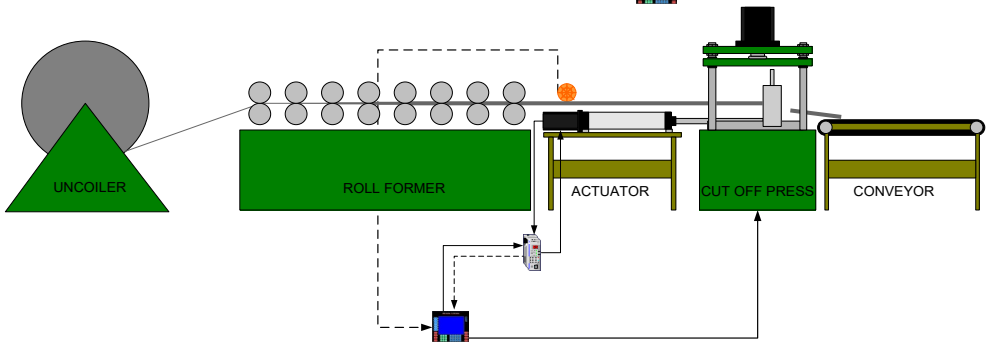


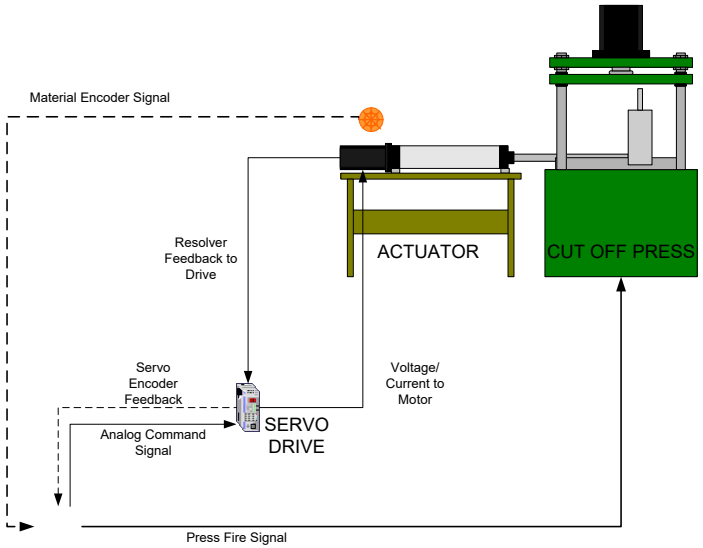


Machine Types

- Open Loop Feed-to-Stop
- Open Loop Flying Cut
- Closed Loop Feed-to-Stop
- Closed Loop Flying Cut

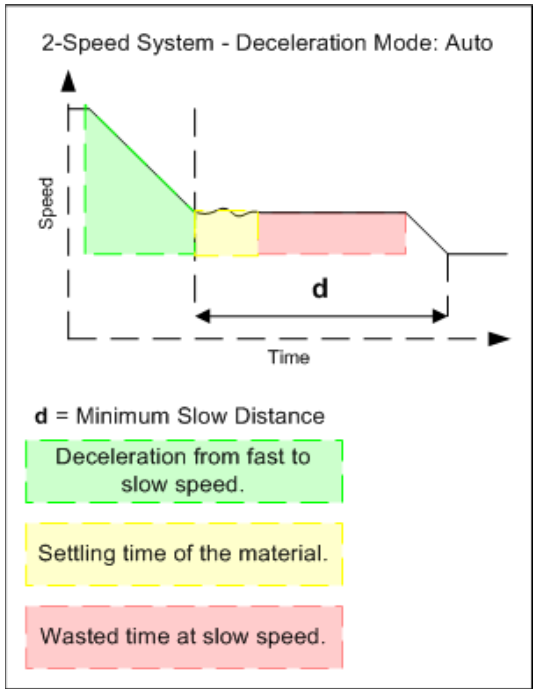


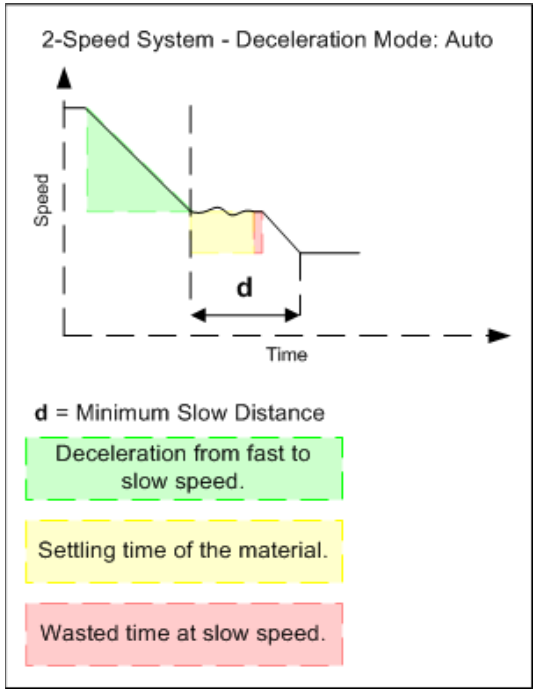




Open Loop Feed-to-Stop

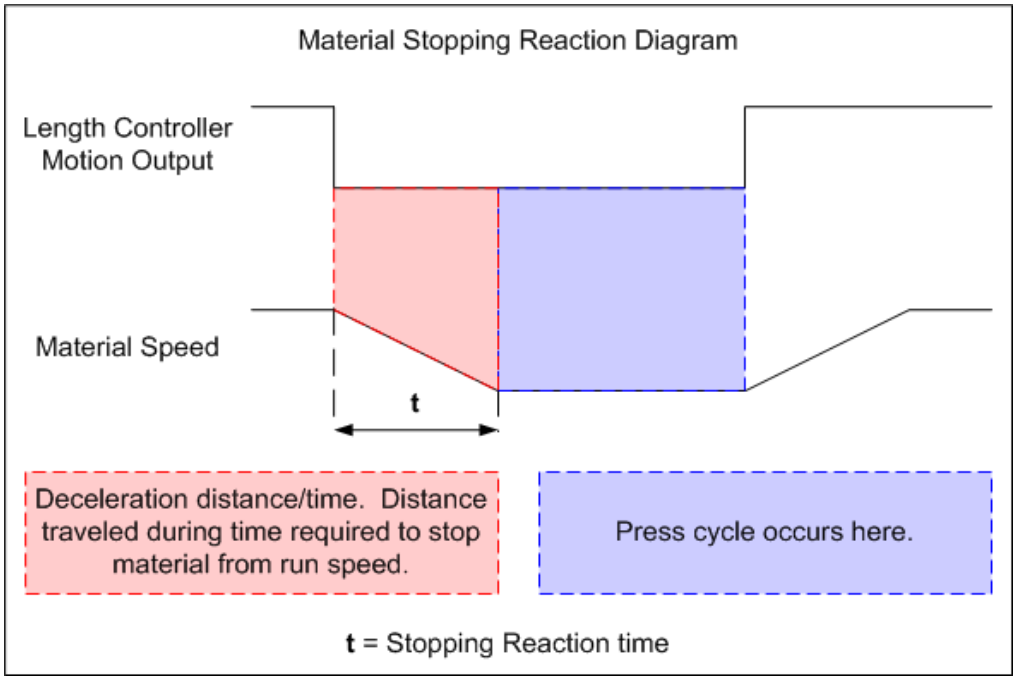
- Pages 67-79
- Minimum Slow Distance





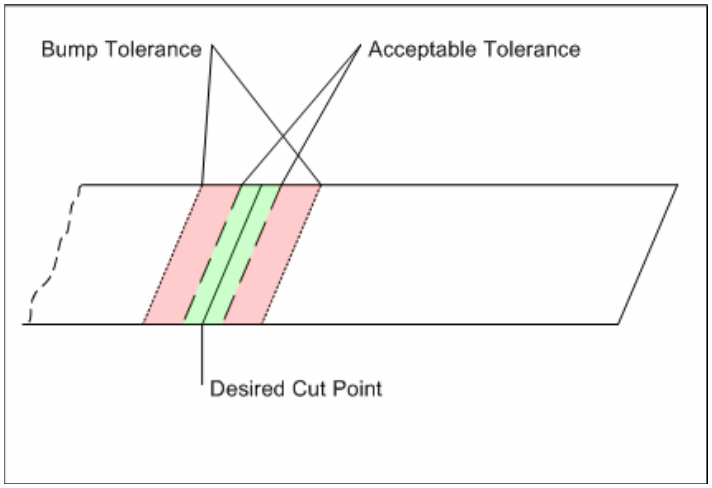
Open Loop Feed-to-Stop (Cont.)

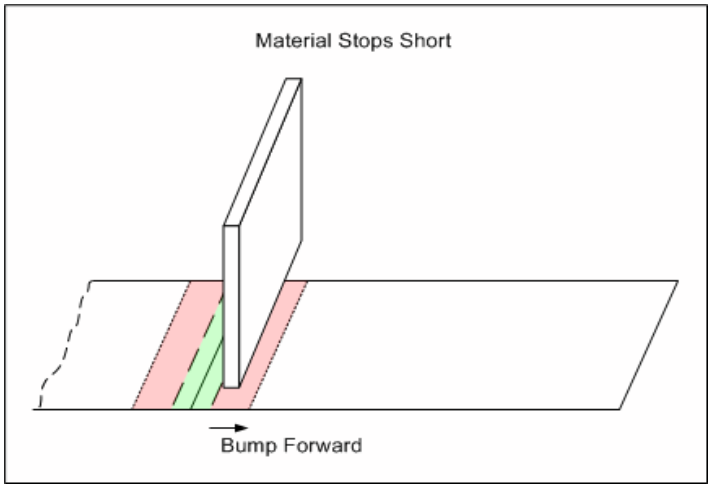
- Pages 67-79
- Stopping Reaction Time
- Stopping Reaction Mode

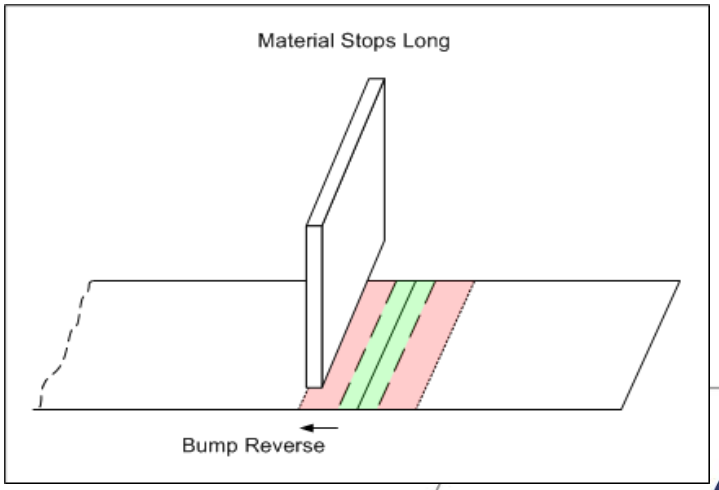


Open Loop Feed-to-Stop (Cont.)

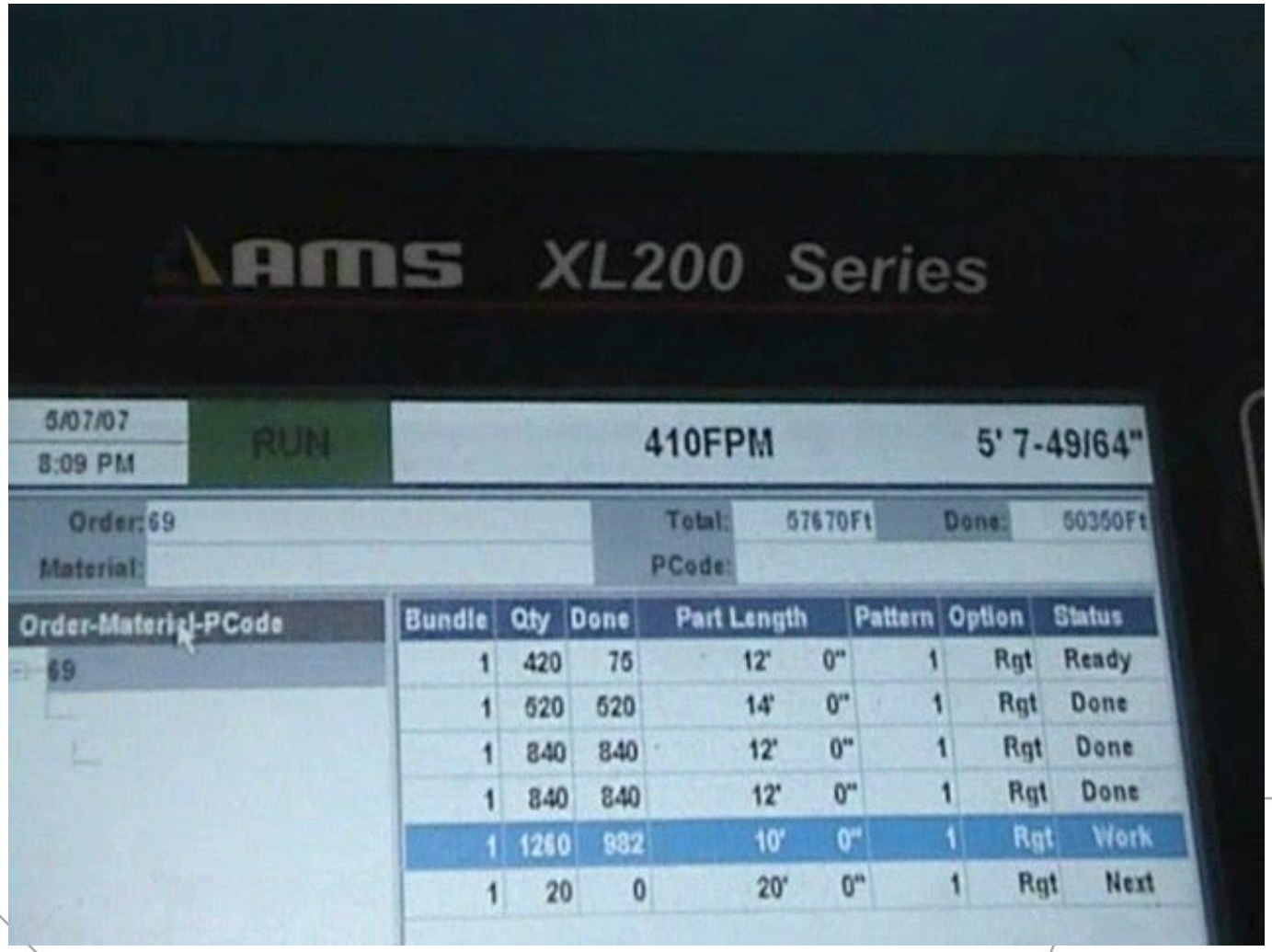
- Pages 67-79
- Bump Tolerance
- Bump Time





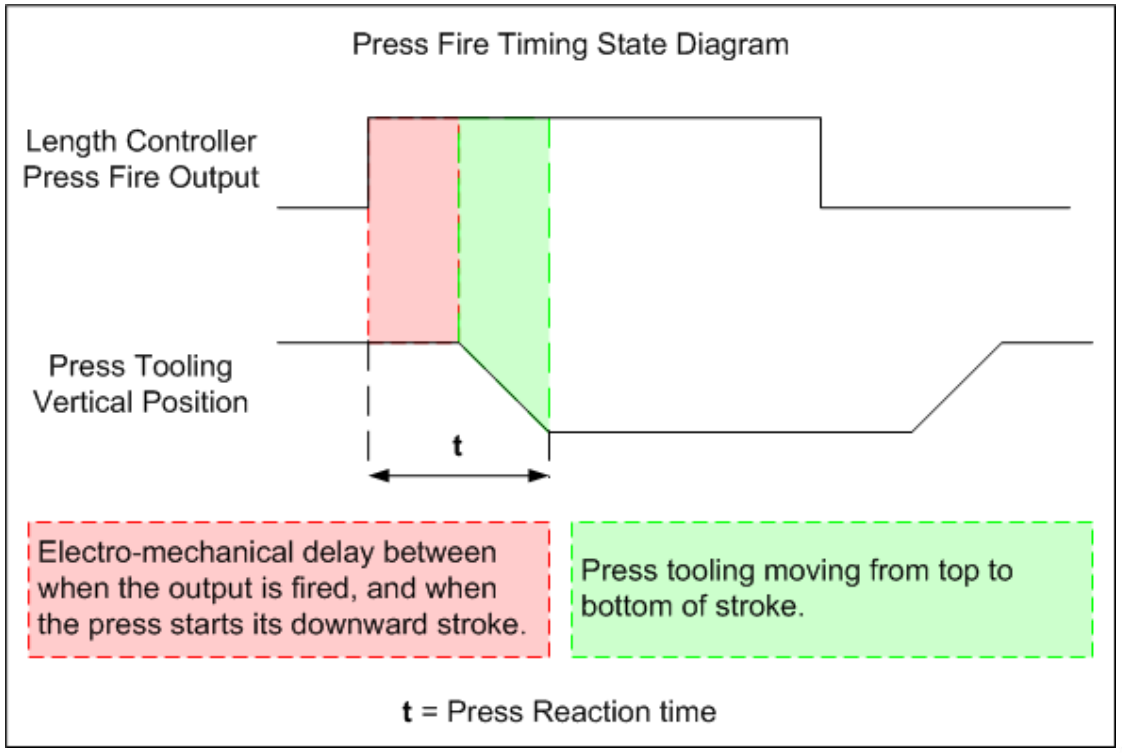


Open Loop Flying Cut



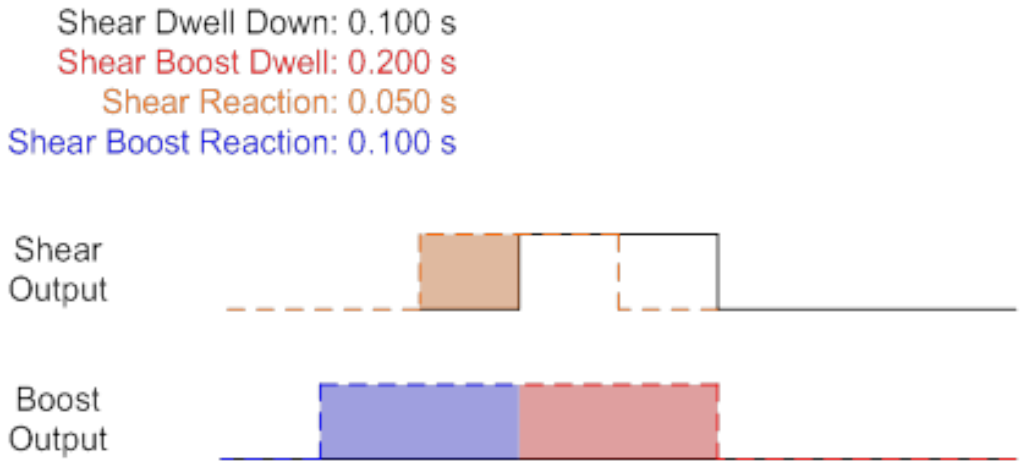
Open Loop Flying Cut

- Pages 80-98
- Shear Reaction



Open Loop Flying Cut (Cont.)

- Pages 80-98
- Shear Boost Dwell
- Shear Boost Reaction



Open Loop Flying Cut (Cont.)

- Pages 80-98
- Shear Boost Enable Velocity
- Shear Boost Compensation
- Velocity at Max Analog Voltage

Closed Loop Feed-to-Stop

Closed Loop Feed-to-Stop

- Pages 99-120
- Line Resolution
- Motor Resolution
- Loop Gain
- Offset Integral
- Offset Voltage (Auto)
- Traction % Threshold
- Traction % Hysteresis
- Jog Velocity
- Slow Run Velocity
- Maximum Velocity
- Acceleration
- Retract After Cut

Closed Loop Flying Cut

- Pages 99-120
- Tolerance Mode
- Minimum Die Distance
- Maximum Die Distance
- Shear Die Distance
- Reference Die on Manual Shear
- Die Resolution
- Lag Integral
- Lag Compensation (Auto)
- Lag Integration Limit
- Jog Select Mode
- Minimum Die Return Velocity
- Maximum Die Return Velocity

Closed Loop Flying Cut (Cont.)

- Pages 99-120
- Acceleration
- Return Acceleration
- Advance After Cut
- Die Reference

Troubleshooting

- Encoder 10-turn Test
- I/O Testing
- Noise
  - Power Supply Connections
  - Servo Drive Connections
  - Shielding
  - Analog Runs
  - Communication Runs
  - Noise Suppression