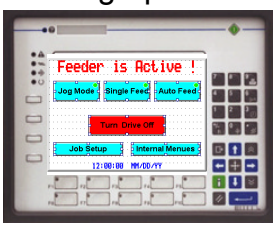
Operators Manual for the Control Techniques

PLC III Cut-to-Length Control System

Unidrive TouchScreen Version
V1.16

Cut-to-Length Feed Control System

The PLC III is a Cut-to-Length system designed with the Operator in mind. Feeder control is a snap with our CTS (Color Touch Screen) Operator Interface unit. Through use of graphical icons Operator control is basically "*Point 'n Touch*". The Operator's keypad/display unit is an oil and dust tight unit offering NEMA 4/12 ingress protection. No special address codes to remember, no complex data to load, just simple, easy to understand machine commands. The highly intelligent operating system even prompts the Operator with English language messages to help him operate the machine, load in new feed lengths and diagnose machine related problems. All this means more efficient operation and increased productivity.

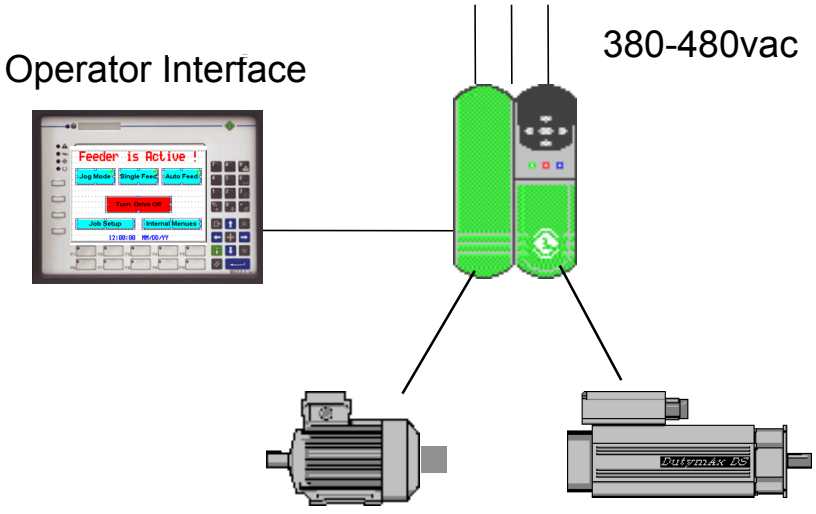


Components

The PLC III basically consists of a remote mountable Operators interface unit and a state-of-the-art Digital AC or DC drive. A powerful co-processor which resides within the drive, executes all the Cut-to-Length application specific software and communicates with the Operator via the remote keypad/display unit over an RS-485 cable at 9600 baud. Because the co-processor resides within the drive itself, it achieves intimate knowledge of all drive activity and can provide motion related commands directly to the drive with no communication delays. This approach brings industrial technology a very powerful and compact Cut-to-Length system.

Motor and Drive

Control Techniques provides the Unidrive high performance AC Vector drive to operate Vector duty AC Induction motors for most new installations. The Unidrive operating in the Servo mode offers the highest system performance with AC Brushless motor technology. In any case, an optical encoder provides high resolution pulse feedback for very accurate motor shaft positioning.

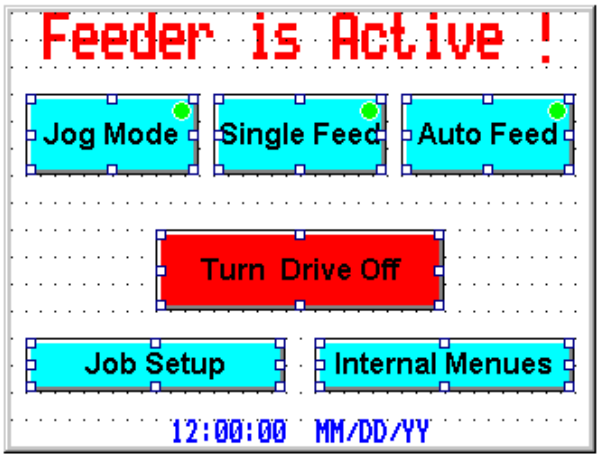


AC Vector Motor AC Brushless Servo Motor

Operating Modes

The standard Control Techniques PLC III Cut-to-Length Controller has three basic operating modes.

Jog Mode
Single Feed Mode
Auto Feed Mode

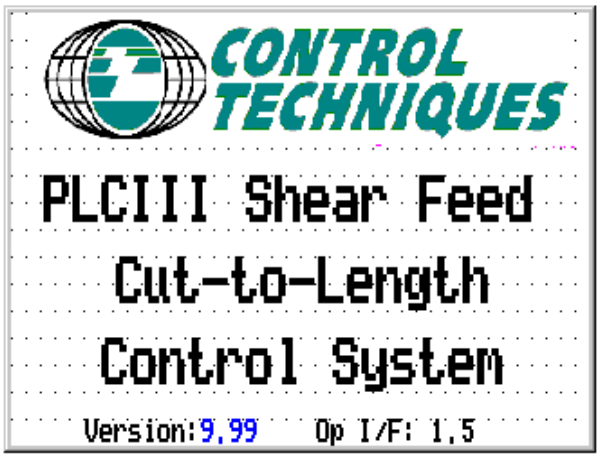


Jog Mode - The Jog Mode allows the Operator to manually feed the material into the machine and position it as it needs to be before performing a feed operation. The PLC III has an optional "Crop Cut" feature that can be selected to permit the Operator to command a press/shear stroke following a Jog operation making the sheet ready for cutting to length.

Single Feed Mode - In the Single Feed mode, the feed system will feed one piece to the press/shear and then stop, waiting for the Operator to initiate another feed. This mode is useful in checking the machine setup before placing it into the Auto Feed Mode.

Auto Feed Mode - the Auto feed mode operates in one of two selectable modes depending on the type of machine that it is applied to.

Feed and Fire

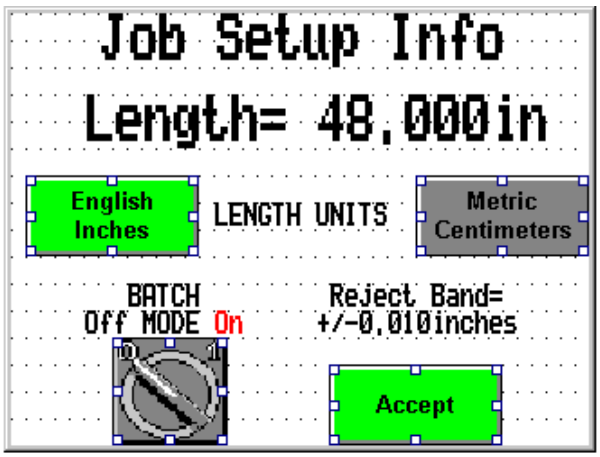


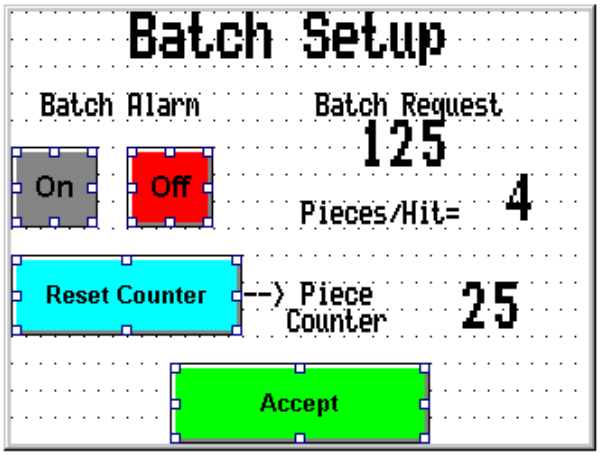
Continuous Feed

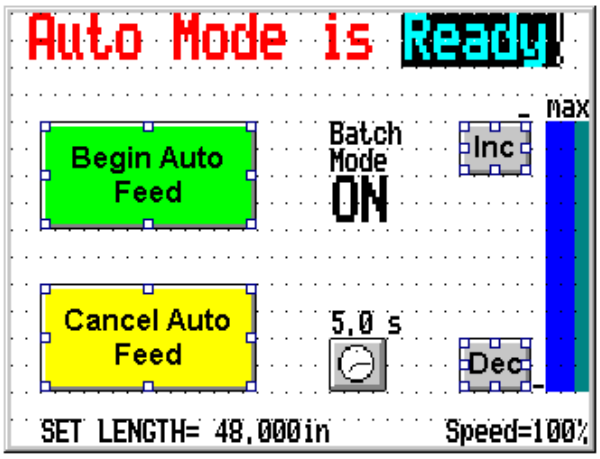
Auto Feed Mode

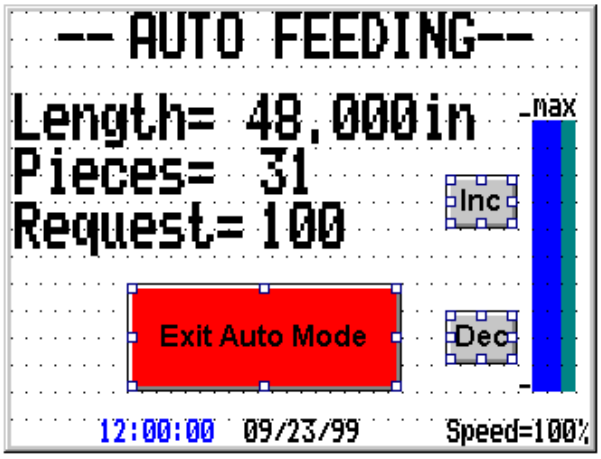
Feed and Fire Operation

In the “Feed and Fire” mode, the feed control system is the master and it controls the cyclic operation of the shear or press. The Cut-to-Length controller will initiate the first feed when Auto Mode is activated, (assuming basic machine checks indicate that it is all right to do so) accelerating the motor to a maximum feed speed and decelerate the motor smoothly after having “metered” out the requested feed length. At that time, a timed output contact is generated to signal the shear or press to cycle once. On the upstroke of the shear/press, a momentary contact closure from a machine mounted limit switch signals the controller to initiate the next feed after performing basic machine checks. This feed and fire sequence will continue until the Operator commands a Feed Stop or upon completion of his/her requested number of pieces (see Single Preset Batch below).



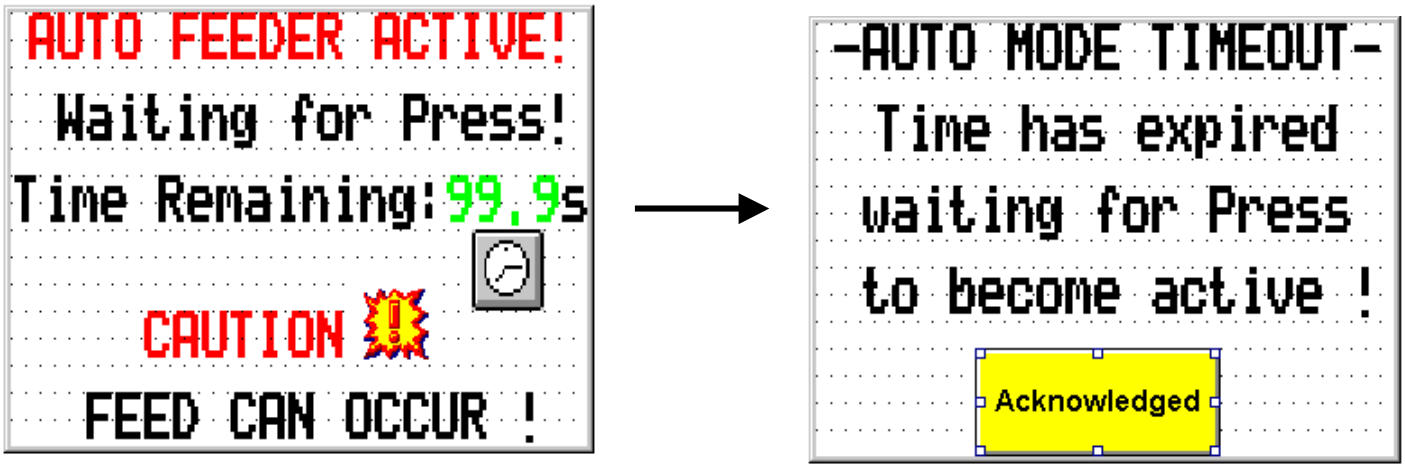




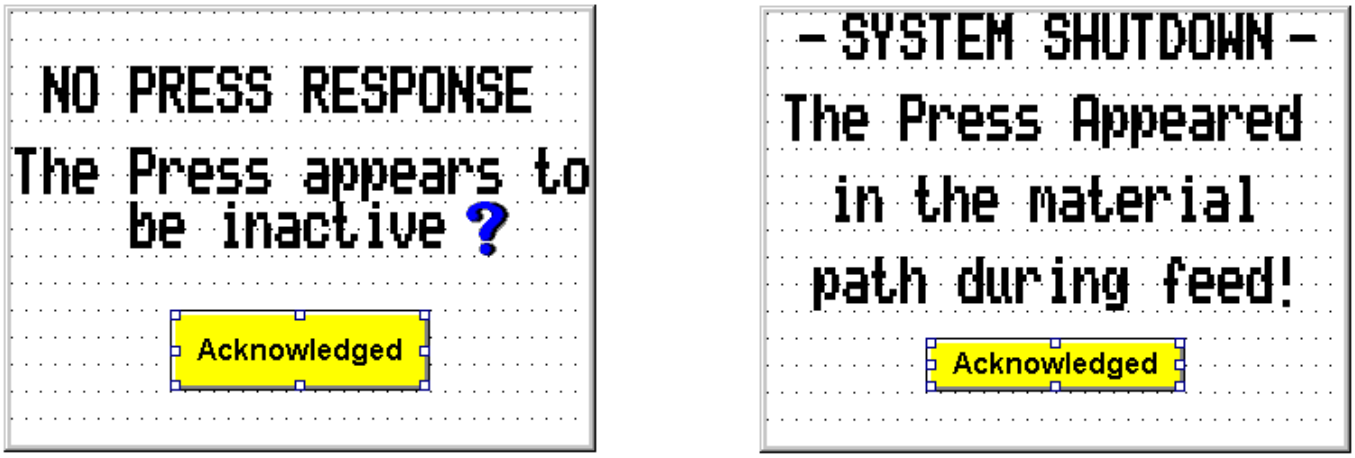


Continuous Press Feed Operation

In this mode of operation the press or shear runs continuously at a rate which will accommodate the requested material feed speed and feed length. Machine operation is started by activation of the Auto Mode at which time the Cut-to-Length controller will begin a time-out sequence while looking for a “Press Up Limit Switch” which should occur on the upstroke of a press. Should this not occur within an adjustable time, the controller will simply exit the Auto Mode so as to not remain “cocked and ready” and issue a message :



During each upstroke this cycle would continue. In the Continuous mode of operation, the feeder system must synchronize with the press or shear. Because the feeder system is not directly initiating each feed, material jams are possible. To help prevent this from occurring, a “checking” routine looks at the position of the press or shear crank. If the material is still in motion at a critical preset crank position, the system will perform an emergency stop and issue an error message.

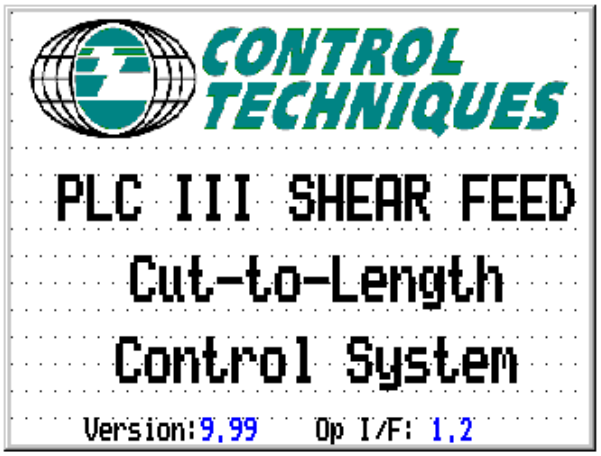


Product Features

- Jog Forward & Jog Reverse w/separately adjustable Accel & Decel Rates (Linear or S-Ramped)
  -Separate Normal and Fast Jog Fwd/Jog Rev Speeds for quick machine setups
- Single Preset Batching with Auto Stop - Controller counts actual pieces where each feed can be making 4 pieces for example. Operator requesting 17 pieces would get 5 feeds or 20 pieces.
- Batch Complete Output for stacker indexing and settable Operator Alarm signaling Batch Complete
- Out of Tolerance piece checking with adjustable window ie. Piece > ±0.020" causes an Output for sorting purposes
- Lengths can be requested in English or Metric units ie. Inches/Centimeters
- English Language displays throughout with Operator prompting and status messages
- A wealth of built-in Machine diagnostics-Maintenance Alarms for Blower Filter & Machine Lubrication
- Automatic Mode de-activation due to Operator inactivity- Time Adjustable *
- Motion Alarm Warning Output for any motion related mode selection *
- Motion into a shear/press in the down position is inhibited and annunciated *
- Length request checking against preset minimum and maximum lengths for a given machine *
- Adjustable Feed Speed via : 5% speed set as low limit minimum *
  - Digital Setpoint 5-100% via Operator Interface or External Computer/PLC via RS-485 communications (AC systems support Interbus S, Profibus, Modbus +, DeviceNet in addition)
  - Analog Signal 0-5v or 0-10v from potentiometer or similar
  - 0-20mA or 4-20mA signal
  - Increase/Decrease Pushbuttons
- Linear or S-Ramped Accel/Decel Feed Slopes
- Average Line Speed Output Signal for Leveller/Straightener and Payoff Coordination
- Remote Fault Reset via Operator Interface
- Historical Fault Log will record and display last 10 faults in chronological order of occurrence
- Post Fault Diagnostic Capture Memory- holds 13 pertinent drive data points for post fault analysis
- Built-In Scope dynamic signal selector offering 2 channels for oscilloscope examination for tuning/analysis
- Material/Machine Jam detection and Drive Shutdown with adjustable level and time *
- Timed Overcurrent Shutdown Ixt for motor overload protection *
- Built-In Technician Diagnostic Field Tools ie. Input Monitor/Keypad Key Test
- Internal Set-up Adjustments protected with User settable security code * (Safety feature)

Cut-to-Length Feed Control System

Upon application of power the OPERATOR INTERFACE (keypad/display unit) will issue an initial message such as:

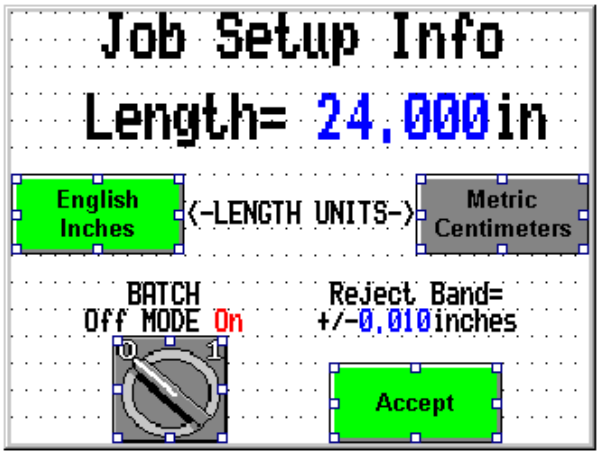


Feed and Fire

Continuous Feed

Depending on the type of system the Cut-to-Length Controller is applied. (See Operating Modes)

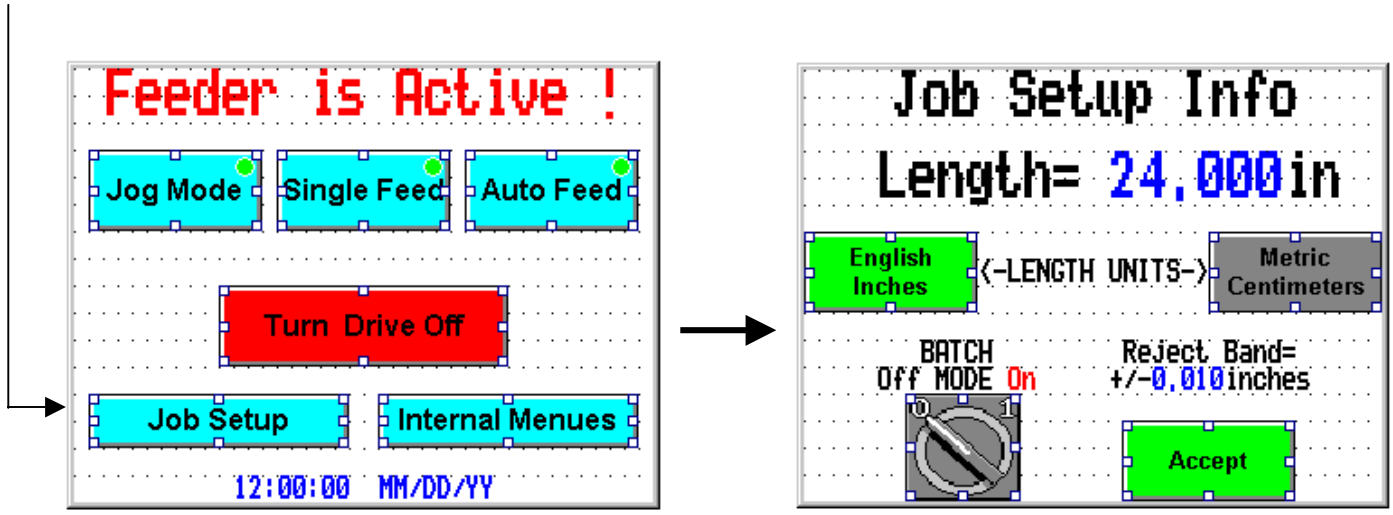
Following this brief message, the last used **Job** settings are displayed and the system waits for the Operators acceptance or for the Operator to alter the required Job Setup requirements.



To accept the current settings the User would depress the **Accept** key.

Changing the Length Setting

To change the Length of material to be fed, the Operator would depress the **Job Setup** key .



The **Job Setup** display shows the last used Length & other Job settings. The controller waits for the Operators acceptance or for the Operator to alter the settings per Job requirements.

To accept the current settings the User would depress the **Accept** key.

Changing a Value or Setting

To change any numeric quantity one would simply touch that number (colored blue) and an “on-screen” numeric keypad should appear. In addition, in the upper left corner of the numeric editing screen the current value of the number and the maximum and minimum value that it can be set to is indicated. To enter a new number one would simply depress the required number with decimal point (if required). Extreme limits for the number value is also displayed in the upper left corner along with the current value of the number that was touched.

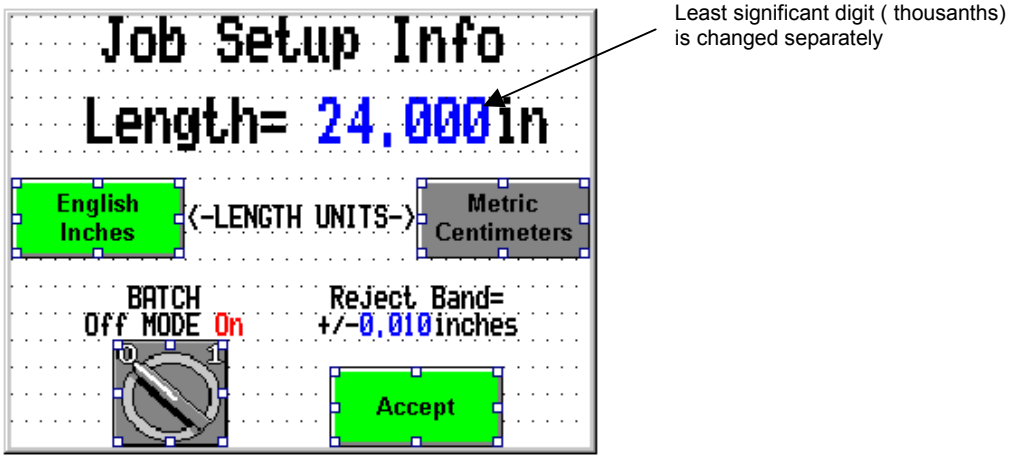
If an error is made you would depress the **CLEAR** key to cancel the change **(//)**. If no entry errors were made you would depress **ENTER** (large key with a left arrow **)** to send that value to the controller.

The Length value entered by the Operator is checked against internally set limits and will be rejected if the value is outside these machine limits. (See Machine & Feed Setup Parameters).

Changing the Length Setting con't

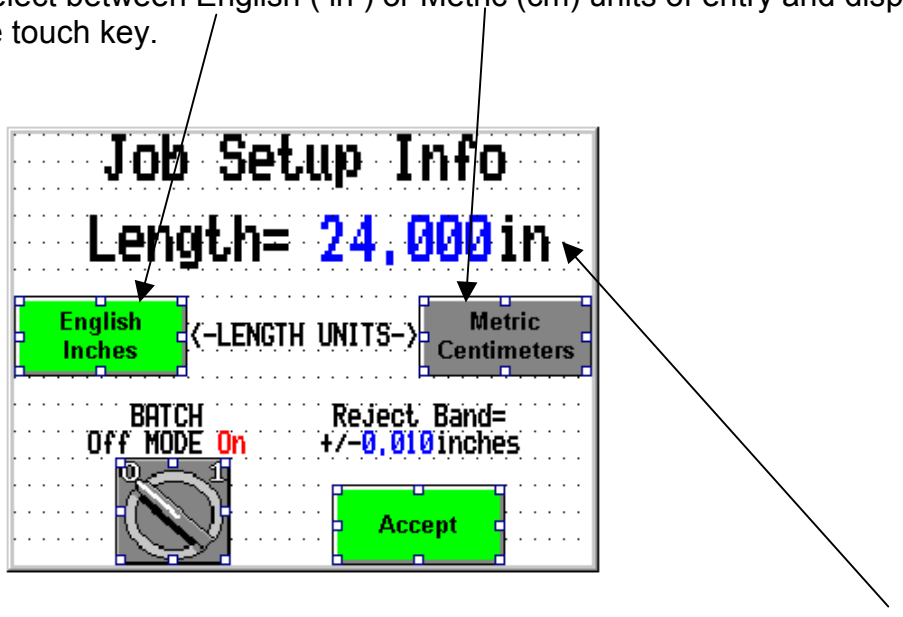
If the new Length is 36.000 inches for example, one would simply depress 36 and ENTER.

If the new Length is 36.375 inches for example, one would depress 36.37 and ENTER. For the final 0.005 you would touch the thousandth's position on the LENGTH number then 5 and ENTER.



English/Metric Units

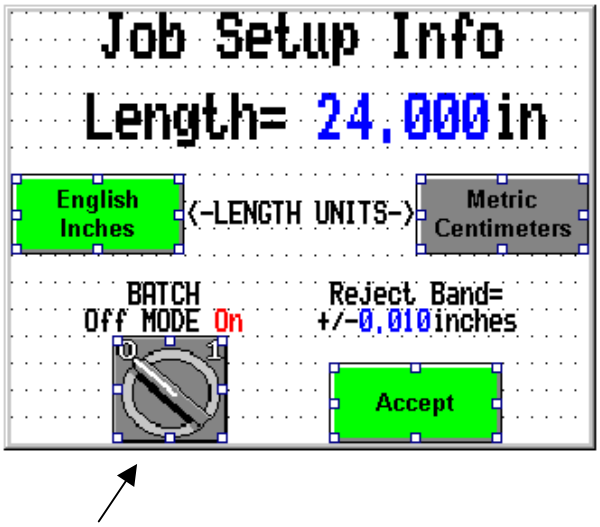
The Operator can easily select between English (in) or Metric (cm) units of entry and display by depressing the appropriate touch key.



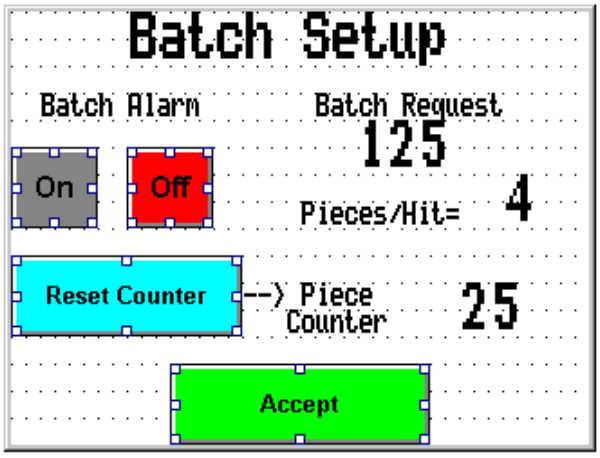
The current unit of measurement is indicated by that touch key (English or Metric) being "green" and the unit is shown following the Length request.

Batch Mode

The PLC III provides the Operator with the ability to process a Batch quantity and automatically stop when the batch is complete. To utilize this function the Batch Enable feature must be turned on within the Job Setup Info screen. (See Job Setup)



To activate the BATCH MODE the Operator would simply touch the Batch Mode switch and it will toggle to the On or Off state with each touch.

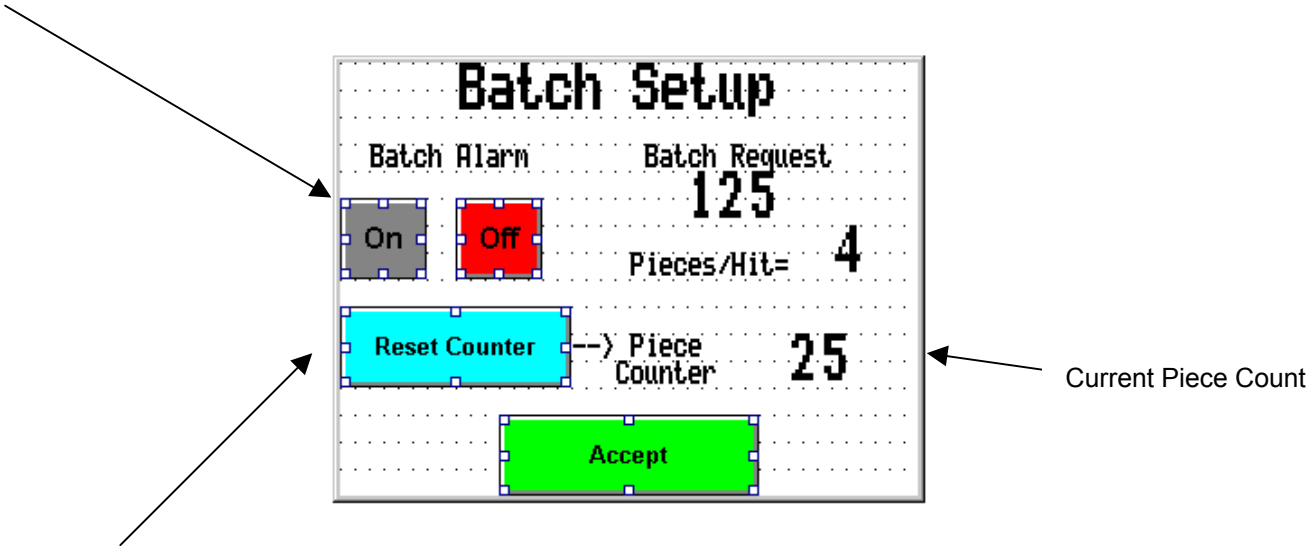


The Operator can now enter the number of pieces that he would like to process as a Batch.

If the machine is setup such that it produces 4 pieces per cut or stroke for example, the Operator can enter this number so that the piece counter counts by four's. When a batch is being processed (see Auto Mode) the batch will be complete whenever the Batch Quantity is met.

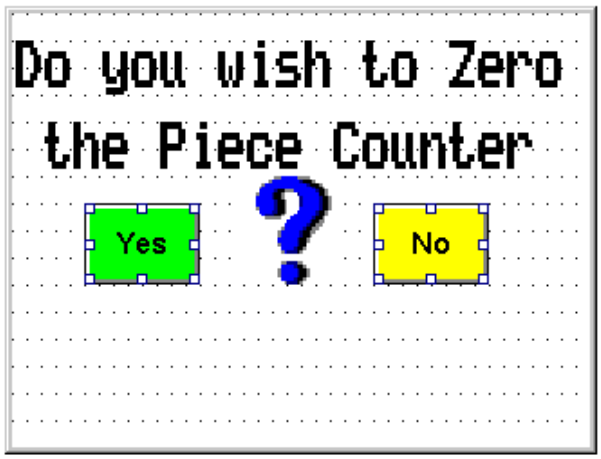
Batch Alarm

An external output contact can also be generated upon this event. This can be used to illuminate a light or sound a batch done alarm to signal an Operator that the Batch is complete. If the **Batch Alarm** option is selected, a periodic alarm output will occur until the Operator acknowledges this event.



Resetting Piece Counter

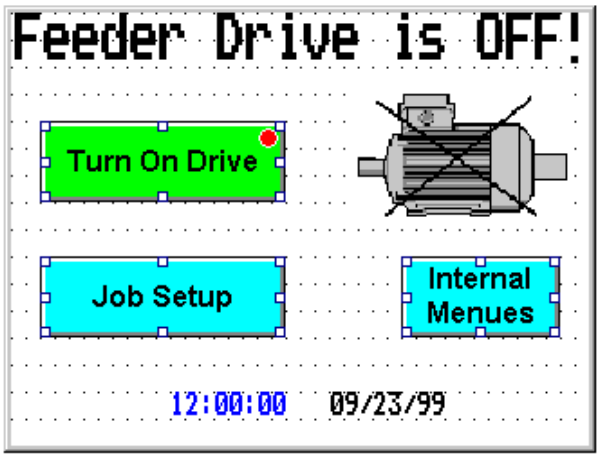
To reset the Piece Counter the Operator would simply depress **Reset Counter** and the following display would appear:



If the Operator would depress **Yes** (indicating an affirmative response to the question), the Piece Counter will be cleared to 0.

If the Operator would depress **No** (indicating an negative response to the question), the Piece Counter will be remain as it was.

Following the acceptance of the past settings or entry of new settings the controller will display the following:



Up to this point the motor drive has power applied but has not been activated.

**********CAUTION**********

The Cut-to-Length Controller is a highly responsive control system. It is capable of moving material through the machine at a very high speed. One should NEVER stand in front of the material path. If there is a system malfunction, material could be moved through the machine at a higher than normal speed.

Turn the Motor Drive Off

When working around the machine :
Setting Up Dies, Clearing Jams, Clearing out scrap etc

Turn the Motor Drive Off

Operator Inactivity Timer

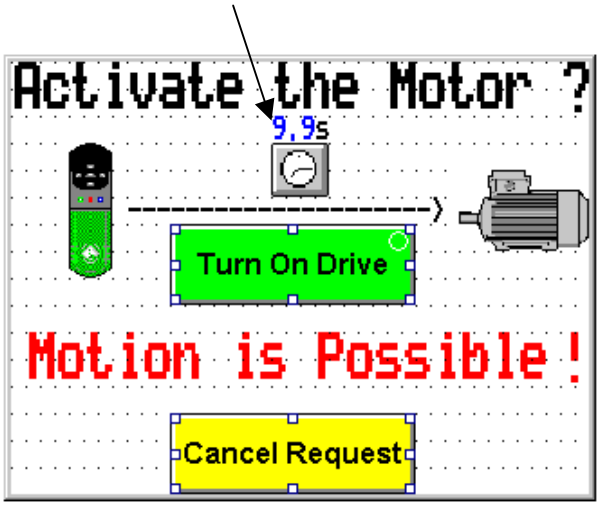
The Cut-to-Length Controller has a built-in adjustable timer to automatically disable motion related commands when they are requested from the Operator Interface Unit. The Inactivity Timer has no effect when commands are externally commanded via selector or pushbutton switches. The inactivity timer provides an additional degree of overall machine safety by backing the controller out of motion related modes should the Operator walk away from the controls after partially requesting motion. For example, should the Operator request enter the Single Feed Mode, the key to command a Single Feed will then become active. Typically, the Operator would then request a few Single Pieces and be done with the Single Feed Mode. If the Operator walks away from the controller while in the Single Feed mode, the controller will begin timing Operator Inactivity and if the Operator has not made a request within the time setting, it will drop out of the active motion related mode.

Modes that the Operator Inactivity Timer are applied to are the:

Jog Mode
Single Feed Mode
Auto Feed Mode

Plus the request to active the Feeder Drive/Motor

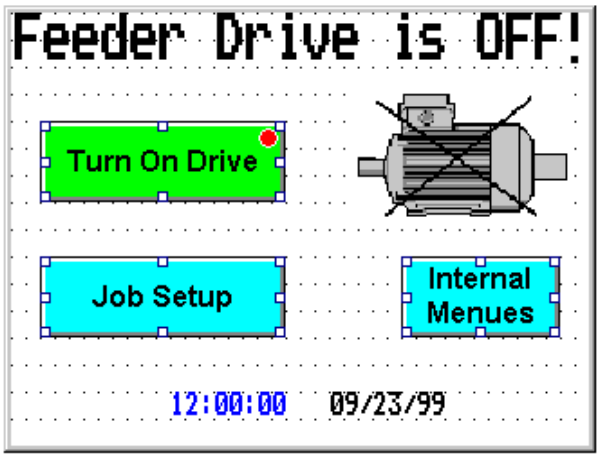
Operator modes that use the Operator Inactivity Timer are indicated by a “clock” symbol. In addition, the Operator can observe the Timer counting seconds down toward expiration.



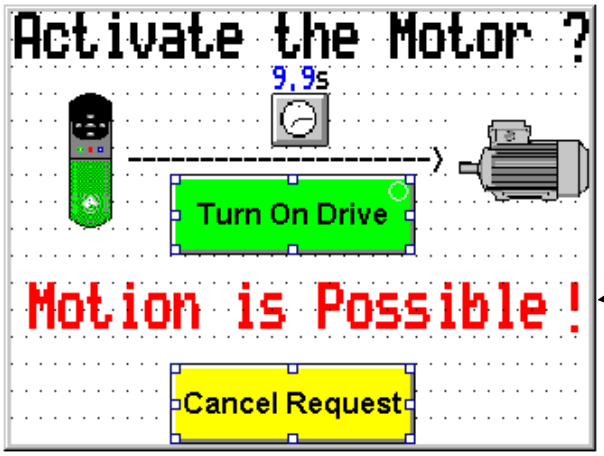
From the screen above, should the timer expire due to Operator Inactivity, the controller would essentially perform a “Cancel Request” and revert back to the previous screen and condition.

Activating the Feeder Drive

If the Operator is ready to use the drive to move material, one would depress **Turn On DRIVE** on the OPERATOR INTERFACE.



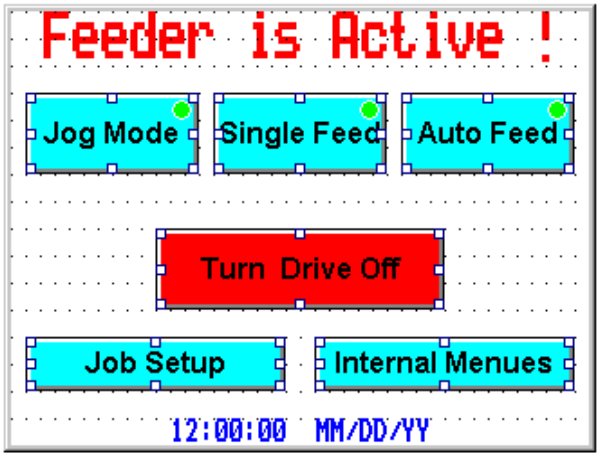
Because a key closure could be accidental, a verification of this request is issued resulting in the following message:



If the closure of the **Turn On Drive** key were a mistake, then one would simply depress **Cancel Request.**

Any time a motor drive is active or is first activated, there is always a possibility of unexpected motion. For this reason, the cautionary message: "**Motion is Possible**" will be flashing. In addition, a built-in warning alarm output is available to sound a beeper or horn for 1-2 seconds. (See Motion Alarm)

Depressing **Turn On Drive** at this prompt will cause the motor drive to become active and hold at zero speed. After the Drive is activated the display will show the following message. Basically, this is the main central screen that will be displayed whenever the Drive is on but not being actively used to move material.



From this screen, the Operator could select an operational mode such as:

Jog Mode
Single Feed Mode
Auto Feed Mode

CAUTION

The Cut-to-Length Controller is a highly responsive control system. It is capable of moving material through the machine at a very high speed. One should NEVER stand in front of the material path. If there is a system malfunction, material could be moved through the machine at a higher than normal speed.

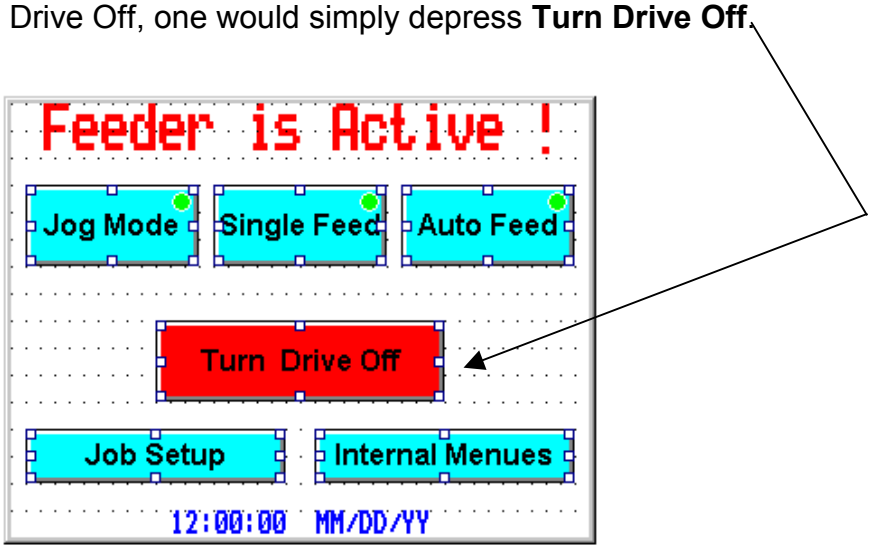
Turn the Motor Drive Off

When working around the machine :
Setting Up Dies, Clearing Jams, Clearing out scrap etc

Turn the Motor Drive Off

De-Activating the Feeder Drive

If it is desired to turn the Drive Off, one would simply depress **Turn Drive Off**.



One should note however that once the Drive is On , it typically is not turned off especially following a Crop Cut or Feeds. The reason for this is because the material is typically coming off a payoff roll and into a material loop or looping pit. The drive is usually left on to "hold the material" into the last position. If the drive is turned off, the material would relax and fall down into the loop or pit area (unless a hold back brake is applied prior to de-activating the drive.

CAUTION

The Cut-to-Length Controller is a highly responsive control system. It is capable of moving material through the machine at a very high speed. One should NEVER stand in front of the material path. If there is a system malfunction, material could be moved through the machine at a higher than normal speed.

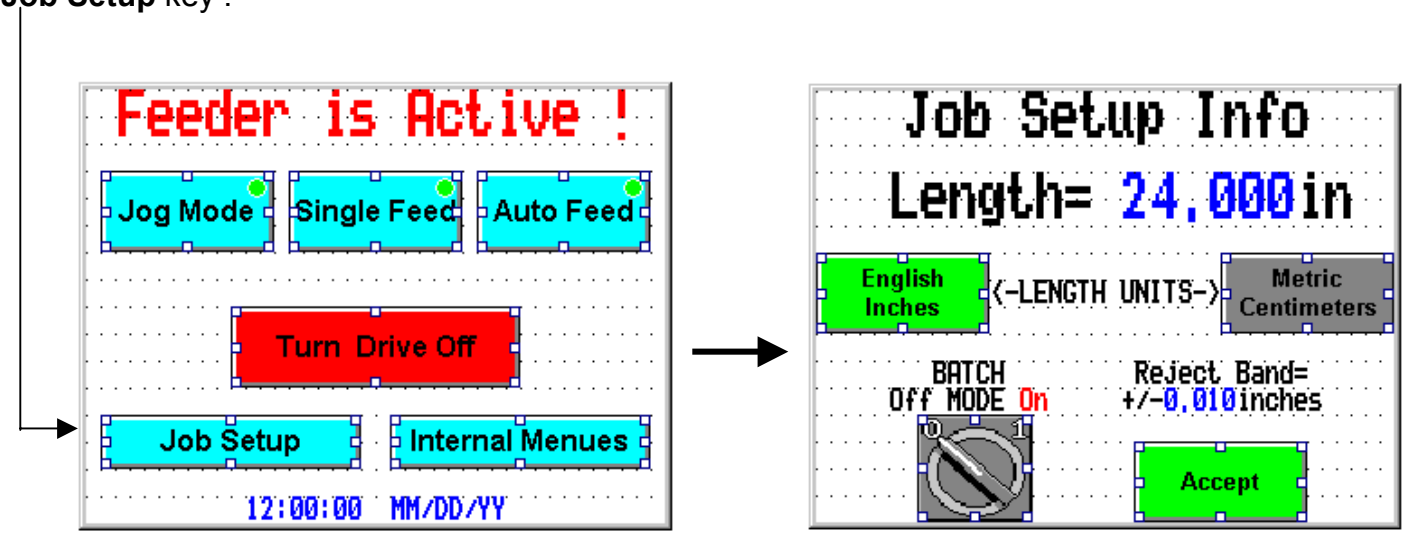
Turn the Motor Drive Off

When working around the machine :
Setting Up Dies, Clearing Jams, Clearing out scrap etc

Turn the Motor Drive Off

Changing the Length Setting

To change the Length of material to be fed, the Operator would depress the **Job Setup** key .

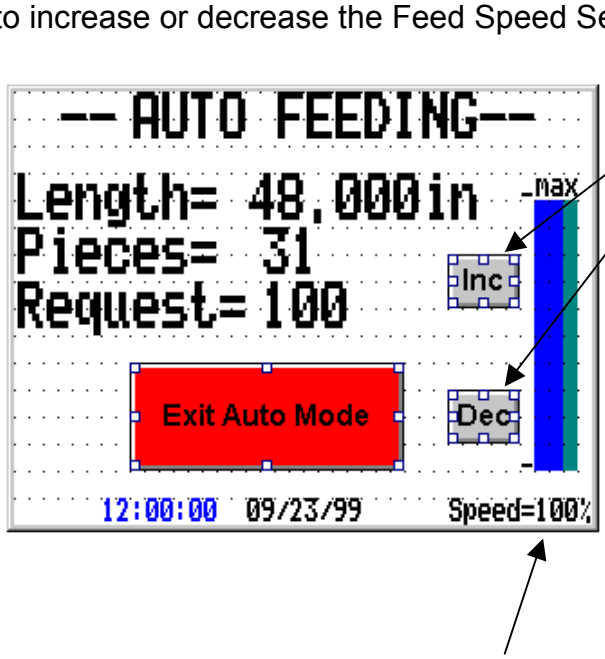


The **Job Setup** display shows the last used Length & other Job settings. The controller waits for the Operators acceptance or for the Operator to alter the settings per Job requirements.

To accept the current settings the User would depress the **Accept** key.

Changing the Feed Speed

If the Feed Speed Option Parameter (See Parameters, Features & Options) is set for Digital (the default) , the Operator can set the desired Feed Speed by simply using the **UP** or **DOWN** arrows (when no fields are flashing) to increase or decrease the Feed Speed Setting by 5%.



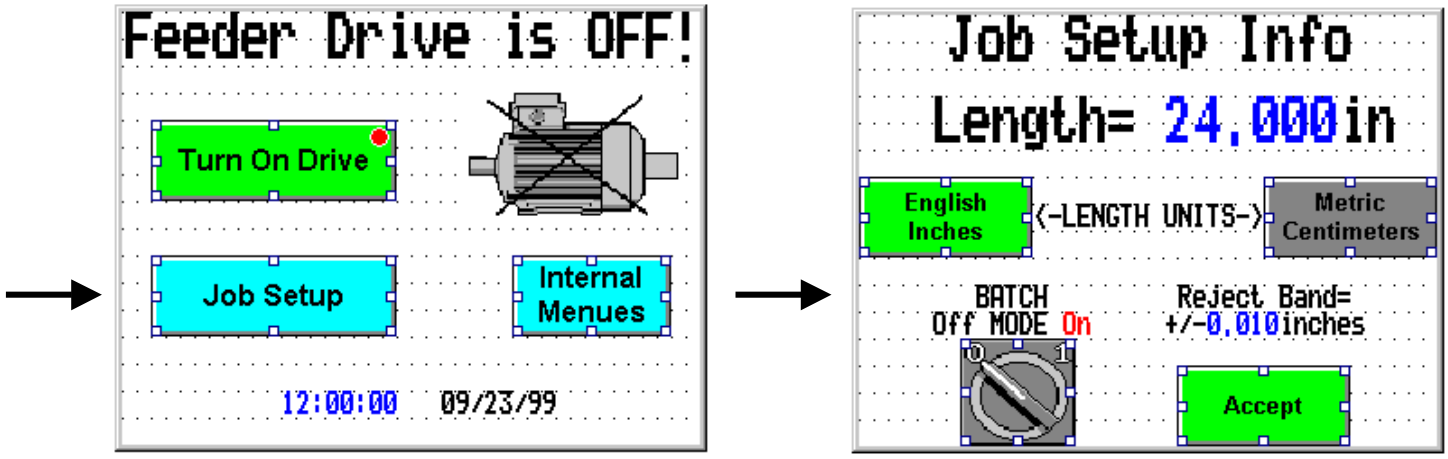
If the Operator wishes to enter some distinct value for Feed Speed, the Operator would simply touch the Speed value in the lower right. The numeric edit screen should appear to permit one to key in the desired value. When finished you would depress the large left arrow key in the lower right of the edit screen (ENTER). Feed Speed is limited to values between 5% and 100%.

Bar Graph Speed Setpoint Indicator

If a Speed change ramp rate is selected, the split vertical bar graph will indicate the new speed setpoint and the ramped speed. After the ramped speed change takes place the two bar graphs should be equal.

Job Setup Options

The Operator may need to select certain features for a “job run” . The Job Setup menu permits the Operator to make such selections.



The Job Setup menu offers the Operator options based on his/her “job” to be run.

English/Metric: This parameter allows the Operator to enter the requested length either in Inches or Centimeters .

Reject Band : This is the tolerance band that is checked at the completion of a cut piece. If the measured piece exceeds this band the controller will set the “Out of Tolerance” bit for this piece.
Range: 0.000-0.099" **Default**: 0.010”

Batch Mode : This function will cause references to 'Pieces' to appear when Length setup is requested. When Batching is enabled and the requested pieces are greater than 0, the controller will continue in the Auto Feed mode until that number of pieces are completed. The controller will stop Auto Feeding and indicate that the requested Batch is complete. After Operator acknowledgment, another Batch of the same quantity will be processed if Auto mode is invoked without altering the Batch quantity.
(See Batch Mode for more details)

Feed Setup Options

Parameter Definitions

English/Metric: This parameter allows the Operator to enter the requested length either in Inches or Centimeters .

1= Metric 0= English **Default**: 0 = English (inches)

Enable Batches : This function will cause references to 'Pieces' to appear when Length setup is requested. When Batching is enabled and the requested pieces are greater than 0, the controller will continue in the Auto Feed mode until that number of pieces are completed. The controller will stop Auto Feeding and indicate that the requested Batch is complete. After Operator acknowledgment, another Batch of the same quantity will be processed if Auto mode is invoked without altering the Batch quantity.
(See Batch Mode for more details)

1=Enabled 0=Disabled **Default**: 1=Enabled

Pieces per Stroke:

The controller can count this number of pieces for each cut or stroke. When operating in the Batch mode and this value is set to 4 Pieces/Cut and the Operator requests 18 pieces, the controller will perform 5 cuts to obtain the 18 pieces requested.
Range: 1-20 Pieces/Cut **Default**: 1 Piece/Cut

Batch Alarm On : This option will cause a periodic alarm output when a Batch is complete and will continue until Operator acknowledgment of Batch Complete.
(See Batch Mode for more details)

1=Yes 0=No **Default**: 1=No

Reject Band : This is the tolerance band that is checked at the completion of a cut piece. If the measured piece exceeds this band the controller will set the "Out of Tolerance" bit for this piece.
Range: 0.000-0.099" **Default**: 0.010"

Rolling Display : This feature causes the display while in the Auto mode, to either update at the end of the feed or continuously scroll. Single Feed updates continuously.

0=Update @ End of Feed 1=Update continuously

Default: 0=Update @ End of Feed

Operating Modes

General Descriptions of Operation

The standard Control Techniques Cut-to-Length Controller has three basic operating modes.

Jog Mode
Single Feed Mode
Auto Feed Mode

Jog Mode - The Jog Mode allows the Operator to manually feed the material into the machine and position it as it needs to be before performing a feed operation. A fast or normal jog speed selection is able to be optionally selected. In addition, the PLC III Cut-to-Length Controller has an optional "Crop Cut" feature that can be selected to permit the Operator to command a press/shear stroke following a Jog operation making the sheet ready for cutting to length.

Single Feed Mode - In the Single Feed mode, the feed system will feed one piece to the press/shear and then stop, waiting for the Operator to initiate another feed. This mode is useful in checking the machine setup before placing it into the Auto Feed Mode.

Auto Feed Mode - the Auto feed mode operates in one of two selectable modes depending on the type of machine that it is applied to.

Feed and Fire
Continuous

Feed and Fire Operation (Typically used with Shear Feed Cutoff Systems

In the "Feed and Fire" mode, the feed control system is the master and it controls the cyclic operation of the shear or press. The Cut-to-Length controller will initiate the first feed when Auto Mode is activated, (assuming basic machine checks indicate that it is all right to do so) accelerating the motor to a maximum feed speed and decelerate the motor smoothly after having "*metered*" out the requested feed length. At that time, a timed output contact is generated to signal the shear or press to cycle once. On the upstroke of the shear/press, a momentary contact closure from a machine mounted limit switch signals the controller to initiate the next feed after performing basic machine checks. This feed and fire sequence will continue until the Operator commands a Feed Stop or upon completion of his/her requested number of pieces (see Batch Mode).

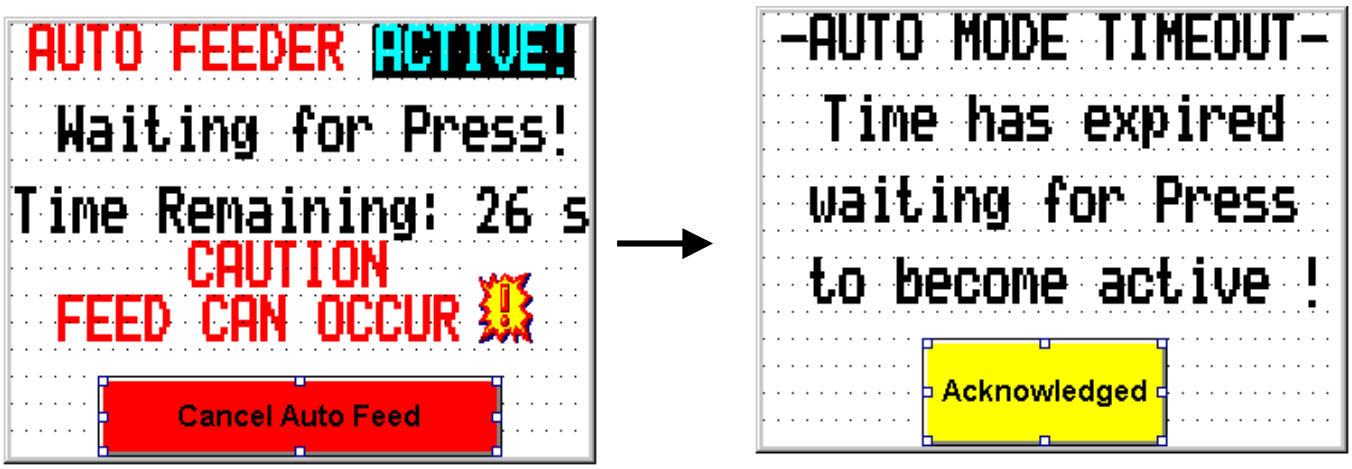
Operating Modes

General Descriptions of Operation –con't

Auto Feed Mode

Continuous Press Feed Operation (Typically used with Press Feed Cutoff Systems)

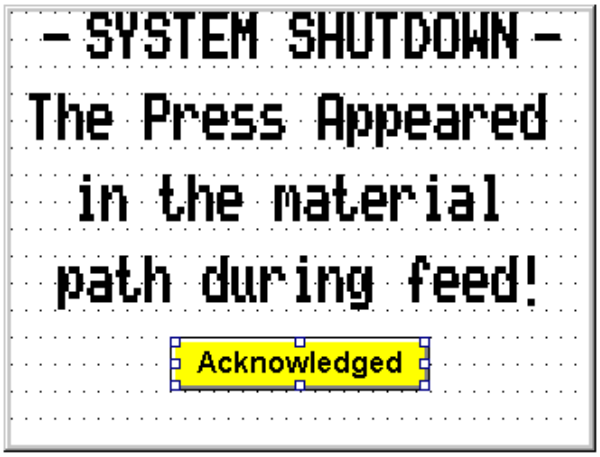
In this mode of operation the press or shear runs continuously at a rate which will accommodate the requested material feed speed and feed length. Machine operation is started by activation of the Auto Mode at which time the Cut-to-Length controller will begin a time-out sequence while looking for a "*Press Up Limit Switch*" which should occur on the upstroke of a press. Should this not occur within an adjustable time, the controller will simply exit the Auto Mode so as to not remain "cocked and ready" and issue a message :



Auto Feed Mode

Continuous Press Feed Operation (Typically used with Press Feed Cutoff Systems)

During each upstroke this cycle would continue. In the Continuous mode of operation, the feeder system must synchronize with the press or shear. Because the feeder system is not directly initiating each feed, material jams are possible. To help prevent this from occurring, a “checking” routine looks at the position of the press or shear crank. If the material is still in motion at a critical preset crank position, the system will perform an emergency stop and issue an error message.



Jog Mode Operation

The Jog Mode allows the Operator to manually feed the material into the machine and position it as it needs to be before performing a feed operation. A fast or normal jog speed selection is able to be optionally selected. In addition, the PLC III Cut-to-Length Controller has an optional "Crop Cut" feature that can be selected to permit the Operator to command a press/shear stroke following a Jog operation making the sheet ready for cutting to length.

To enter or activate the **JOG MODE** the Operator simply depresses the **JOG MODE** key as shown below.

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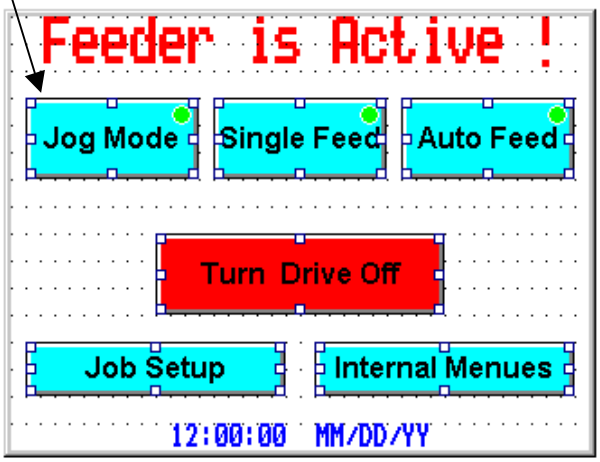
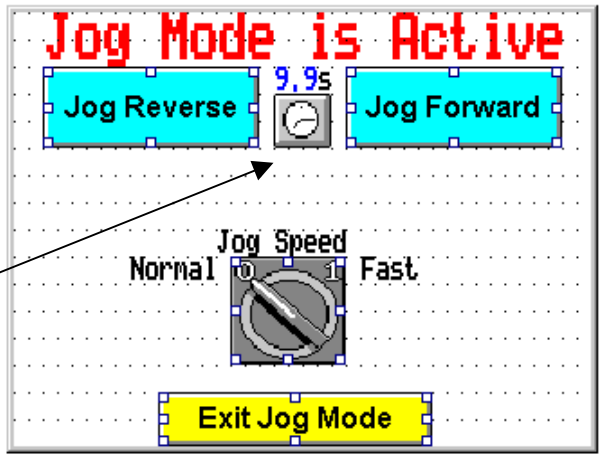


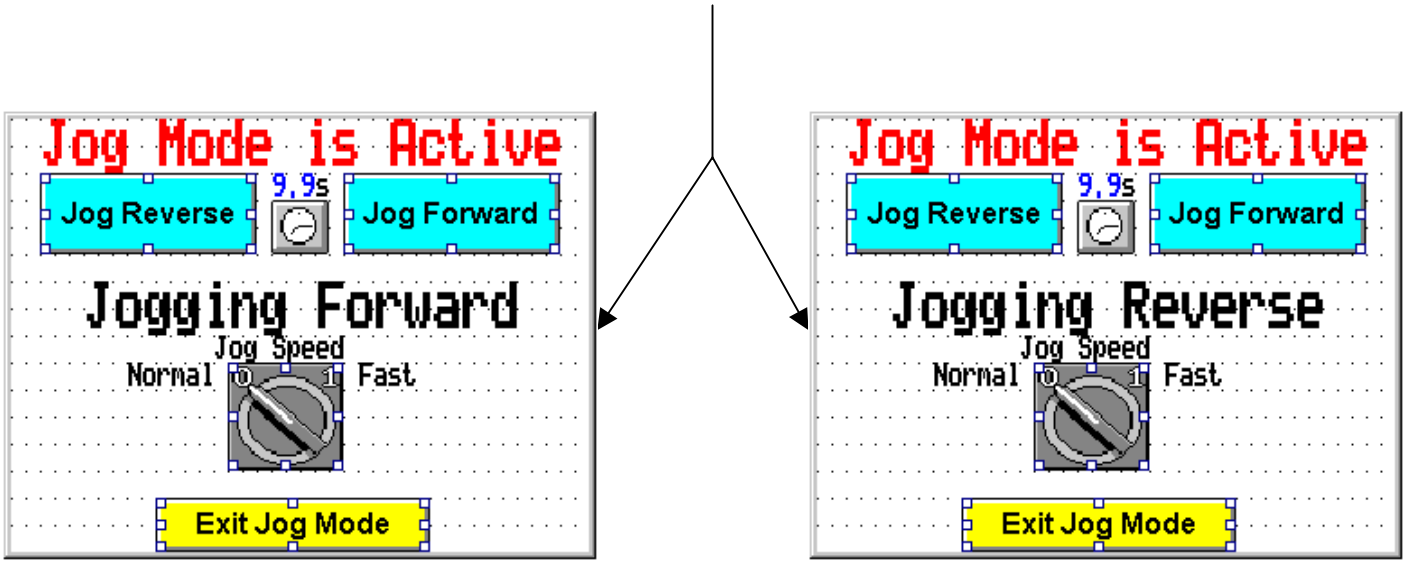
If the entry to the **JOG MODE** were a mistake, then one would simply depress **Exit Jog Mode.**

To cause the machine to actually Jog the material, the Operator would depress the appropriate **Jog Forward** or **Jog Reverse** key. Once motion has begun the display will change to reflect the current jog action as shown below:



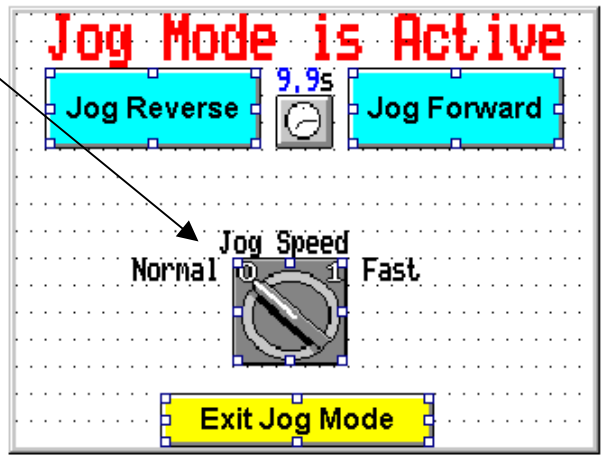
Operator Inactivity Timer

When a Jog key is depressed, a confirmation message will appear indicating the Jog direction and the selected Jog speed.



Fast Jog Speed

The Operator can select between the **Fast** and **Normal** Jog Speed by depressing the JOG SPEED selector switch on the keypad/display unit. It will toggle between the alternate state that is being displayed.

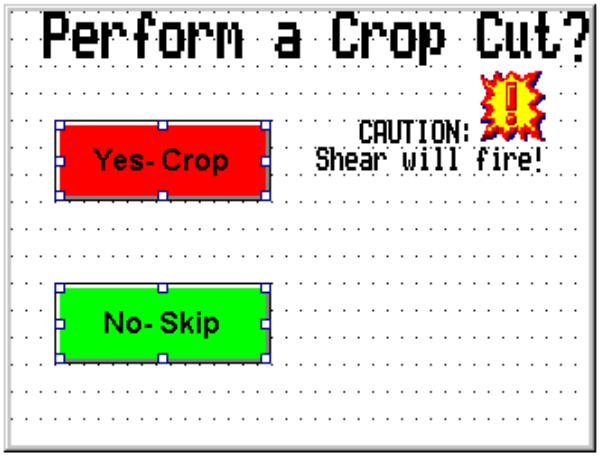


The Fast and Normal Jog Speeds and accel/decel rates are set in the **Jog Details** setup menu within the **Internal Menu's**.

To leave the JOG MODE the Operator would depress the **MODE OFF** key.

Crop Cut (optional)

The Jog Mode allows the Operator to manually feed the material into the machine and position it as it needs to be before performing a feed operation. The PLC III Cut-to-Length Controller has an optional "***Crop Cut***" feature that can be selected to permit the Operator to command a press/shear stroke from the OPERATOR INTERFACE following a Jog operation making the sheet ready for cutting to length. If this feature has been selected from the **Jog Details** setup menu, the following display will appear after exiting the JOG MODE:



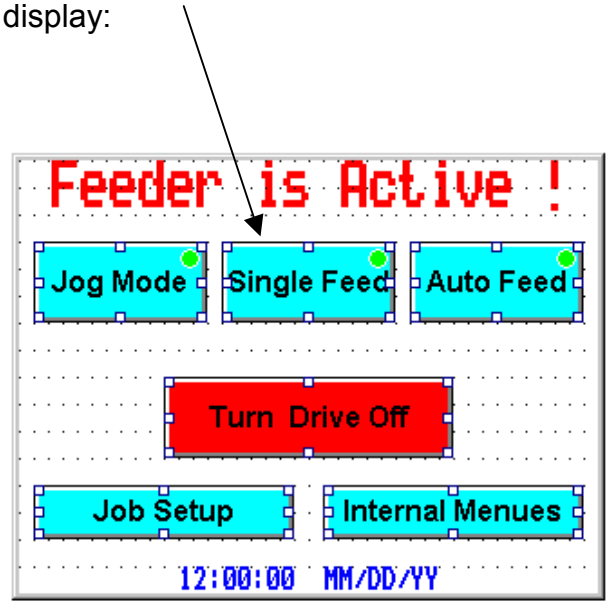
An affirmative response to this question (caused by depressing the **Yes - Crop** key), will cause an **immediate** stroke of the Press or Shear.

A negative response to this question (caused by depressing the **No-Skip** key), will skip the Crop Cut action.

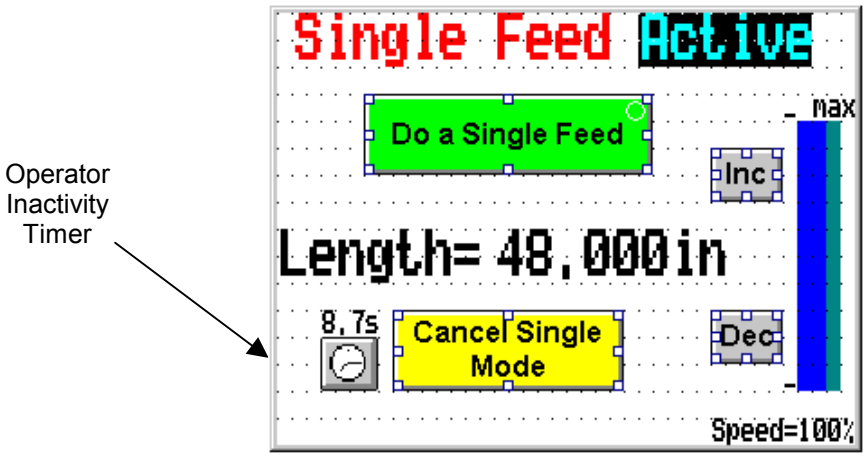
Single Feed Mode Operation

In the Single Feed mode, the feed system will feed one piece to the press/shear and then stop, waiting for the Operator to initiate another feed. This mode is useful in checking the machine setup before placing it into the Auto Feed Mode.

To enter or activate the **SINGLE FEED MODE** the Operator simply depresses the **SINGLE FEED** key as shown below. Because a key closure could be accidental, a verification of this request is issued resulting in the following display:

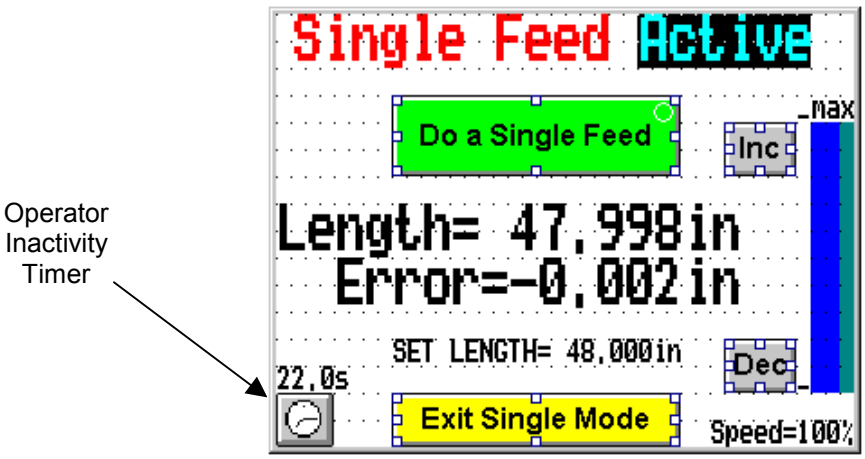


If the closure of a **SINGLE FEED** key were a mistake, then one would simply depress **Exit Single Mode** to Exit the mode.



Performing a Single Feed

To cause the machine to actually Feed the material, the Operator would depress the **Do a SINGLE Feed** key. Once motion has begun the display will change to reflect the feed action as shown below:



To leave the **SINGLE FEED MODE** the Operator would depress the **Exit Single Mode** key.

Auto Feed Mode Operation

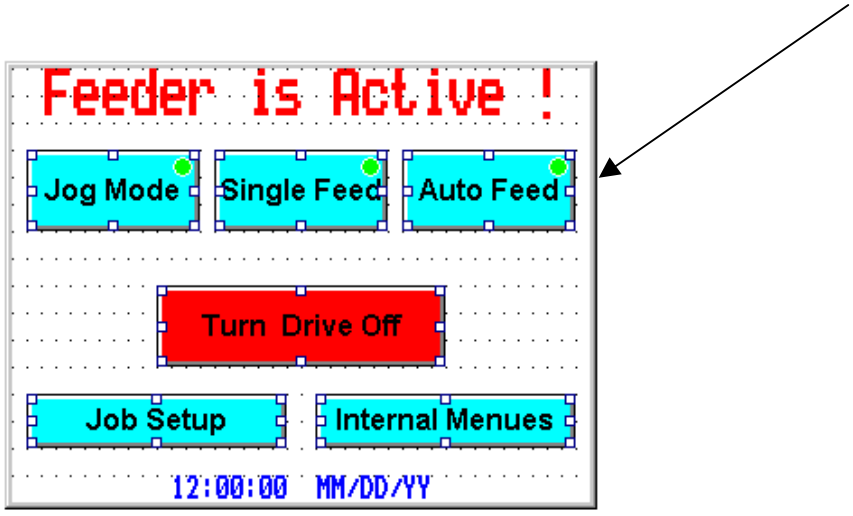
The Auto Feed mode operates in one of two selectable modes depending on the type of machine that it is applied to.

Feed and Fire
Continuous Feed

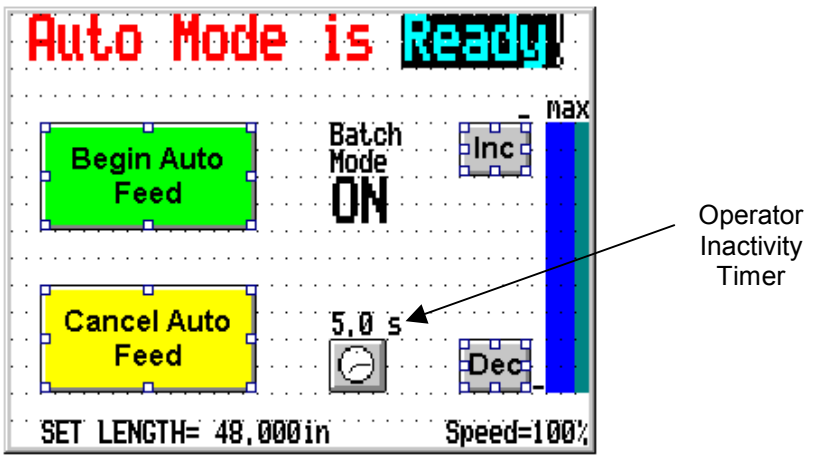
Feed and Fire Operation

In the “Feed and Fire” mode, the feed control system is the master and it controls the cyclic operation of the shear or press. The Cut-to-Length controller will initiate the first feed when Auto Mode is activated, (assuming basic machine checks indicate that it is all right to do so) accelerating the motor to a maximum feed speed and decelerate the motor smoothly after having “metered” out the requested feed length. At that time, a timed output contact is generated to signal the shear or press to cycle once. On the upstroke of the shear/press, a momentary contact closure from a machine mounted limit switch signals the controller to initiate the next feed after performing basic machine checks. This feed and fire sequence will continue until the Operator commands a Feed Stop or upon completion of his/her requested number of pieces (see Batch Mode).

To enter or activate the **AUTO FEED MODE** the Operator simply depresses the **Auto Feed** key as shown below.



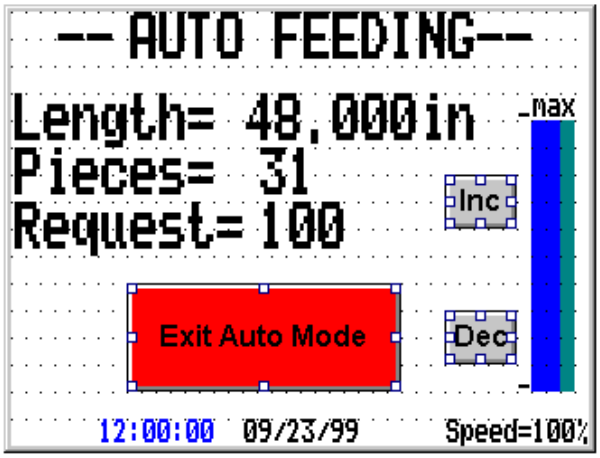
Because a key closure could be accidental, a verification of this request is issued resulting in the following message:



If the closure of a **Auto Feed** key were a mistake, then one would simply depress **Cancel Auto Feed** to Exit the mode.

To cause the machine to actually begin Auto Feeding the material, the Operator would depress the **Begin Auto Feed** key. Once motion has begun the display will change to reflect the feed action as shown below:

The display will update with the processed length at the end of the feed following the stroke of a press or shear. Then another feed will commence and the cycle continue until the Batch is complete or until the Operator intervenes by exiting the **Exit Auto Mode**.



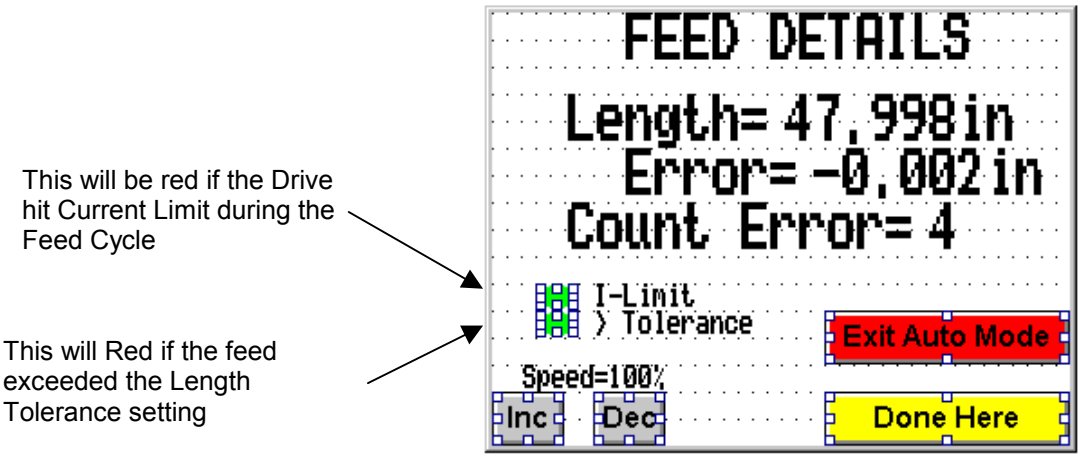
To leave or exit the **AUTO FEED MODE** the Operator would depress the **Exit Auto Mode** key. The current feed in progress will continue until complete then the controller will stop feeding and exit the **AUTO MODE**.

Auto Feed Mode Operation

Feed and Fire Operation

Feed Details

While the Feeder system is cycling, it is possible to obtain additional details concerning the feeds. By depressing the **DETAILS** key on the Operator Interface panel. The display will indicate the following details:



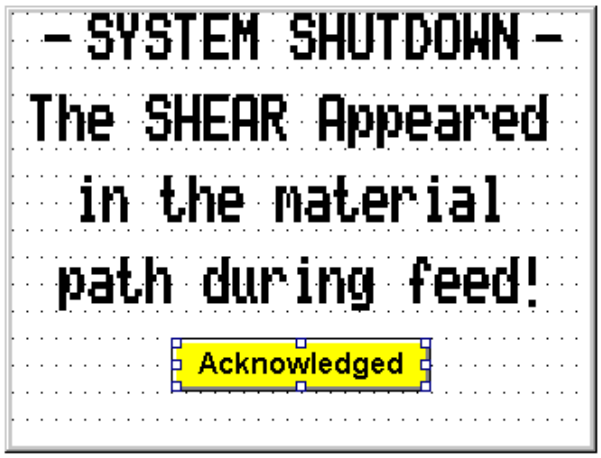
If Operating in the Digital Speed mode, the Feed Speed can be adjusted by depressing the **Inc** or **Dec** keys. This will provide adjustments in 5% increments for 5%-100% speed.

To leave or exit the **AUTO FEED MODE** the Operator would depress the **Exit Auto Mode** key. The current feed in progress will continue until complete then the controller will stop feeding and exit the **AUTO MODE**.

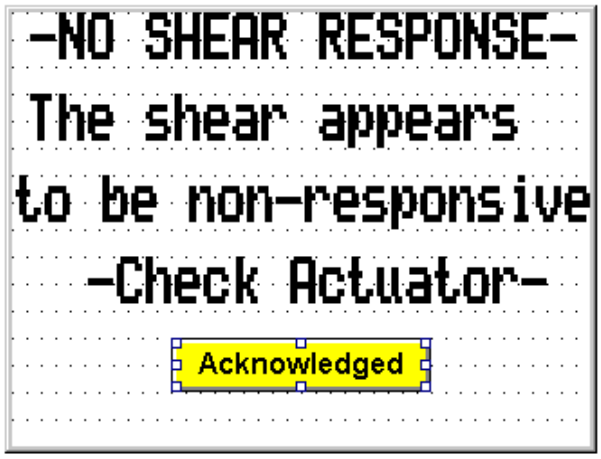
To revert back to the previous display the Operator would depress **Done Here**.

Shear Problems

All information about the Shear is derived simply from a cam limit switch. When the Shear is in an up position or out of the material path, the limit switch is in one state and when the Shear goes into the material path on the downstroke, the limit switch is in its' alternate state. Should the feed still be in progress upon the downstroke of the Shear, the feeder will perform an emergency stop shutdown and display the following message:

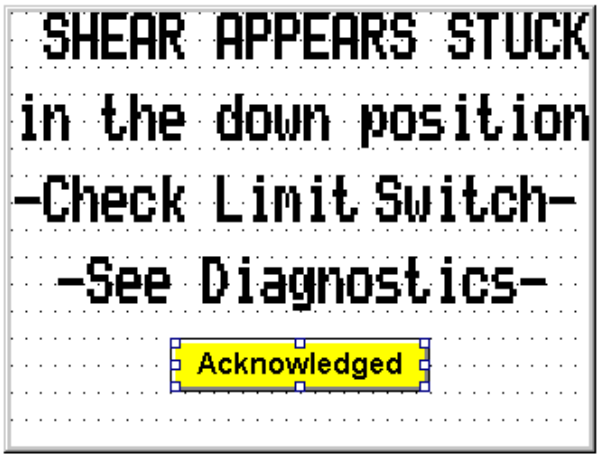


If the PLCIII had issued a Shear command but the PLCIII **not** receive the limit switch signal of the Shear being in down position, an internal timer would be expiring. Upon expiration the controller will leave the **AUTO MODE** and display the following message:

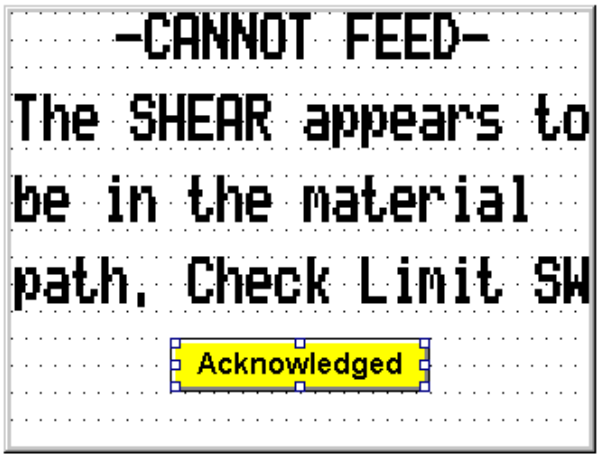


Shear Problems con't

If the Shear had been commanded to actuate and the PLCIII did receive the limit switch signal of the Shear being in down position but did not see the Shear go back to its retracted position (per it's limit switch) an internal timer would be expiring. Upon expiration the controller will leave the **AUTO MODE** and display the following message:



If the Shear is in the down position prior to a motion request such as Jog or Single Feed, the controller will deny that request and exit that mode plus display the following message:

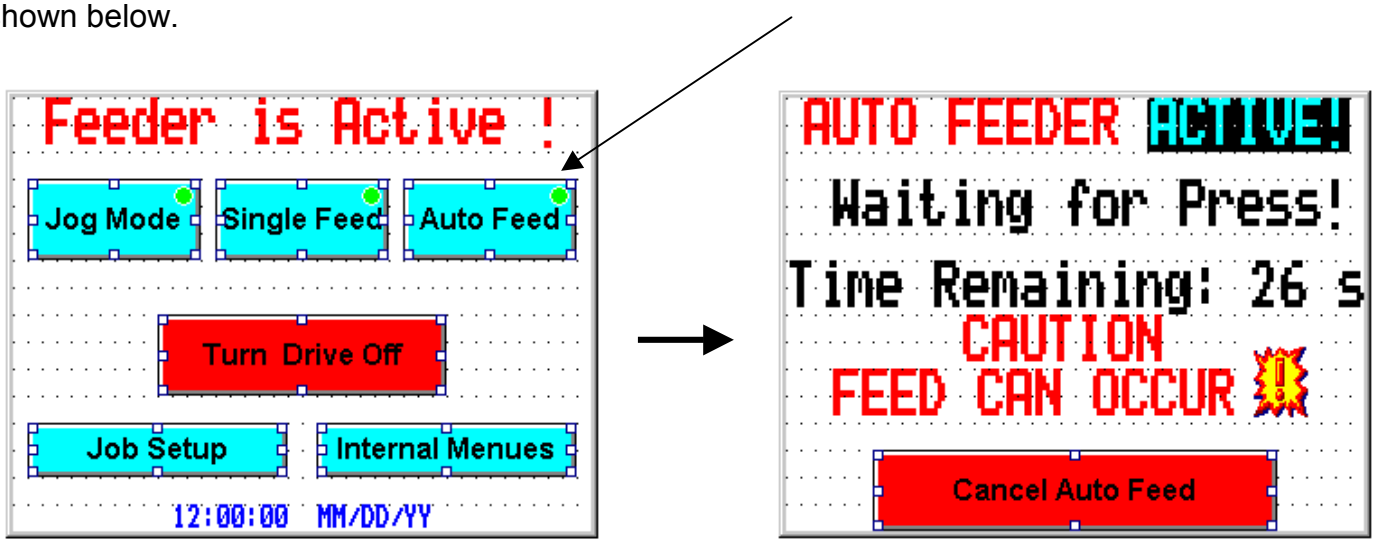


Auto Feed Mode Operation

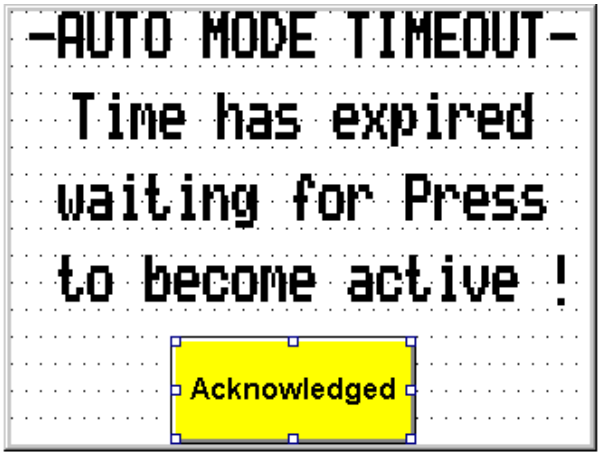
Continuous Press Feed Operation

In this mode of operation the press or shear is set to run continuously at a rate which will accommodate the requested material feed speed and feed length. Machine operation is started by activation of the **Auto Mode**. The Press could be already running or started after the Feed Controller has been placed into Auto. If the Press was already running prior to the controller being placed in Auto, the controller will be waiting to synchronize. It will wait looking for the next "Press Up Limit Switch" transition which should occur on the upstroke of a press.

To enter or activate the **AUTO FEED MODE** the Operator simply depresses the **Auto Feed** key as shown below.



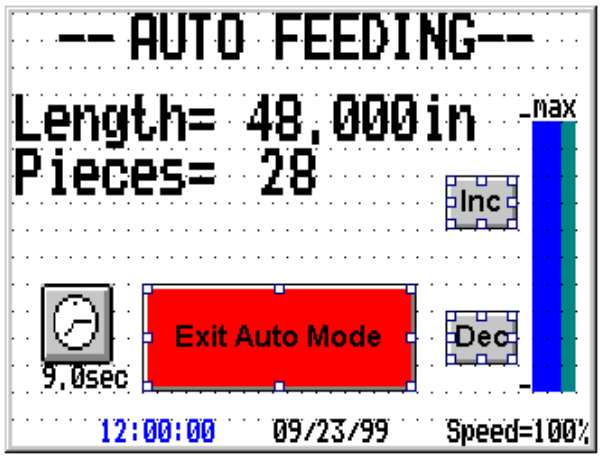
In the case where the controller is placed into the **Auto Feed Mode** prior to the Press, the Cut-to-Length controller begins a time-out sequence (the time is adjustable) while waiting for the next "Press Up Limit Switch" transition. Should this not occur within this time, the controller will simply exit the Auto Mode so as to not remain "*cocked and ready*" and issues the following message :



Auto Feed Mode con't

Continuous Press Feed Operation

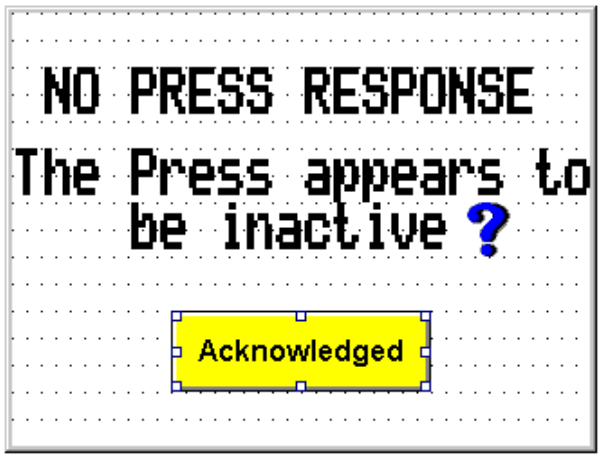
Once motion has begun the display will change to reflect the feed action as shown below:



The display will update with the processed length at the end of the feed following the stroke of a press or shear. Then another feed will commence and the cycle continue until the Batch is complete or until the Operator intervenes by depressing **Exit Auto Mode**.

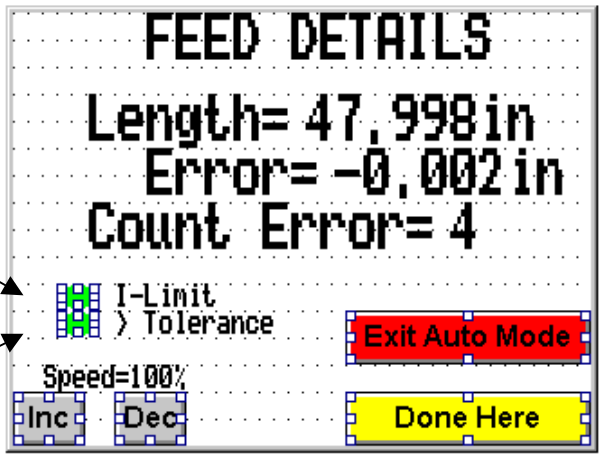
To leave or exit the **AUTO FEED MODE** the Operator would depress the **Exit Auto Mode** key. The current feed in progress will continue until complete then the controller will stop feeding and exit the **AUTO MODE**. The Press may continue to "dry-cycle" depending on system logic design.

If the Operator stops the Press, the controller still being in Auto Mode, will begin timing waiting for the next Press upstroke. If that upstroke does not occur before the timer expiration, the controller will exit the Auto Feed Mode and display:



Feed Details

While the Feeder system is cycling, it is possible to obtain additional details concerning the feeds. By depressing the **DETAILS** key on the Operator Interface panel. The display will indicate the following details:



This will turn red if the Drive hit Current Limit during the Feed

This will turn Red if the feed exceeded the Length Tolerance setting (Reject Band)

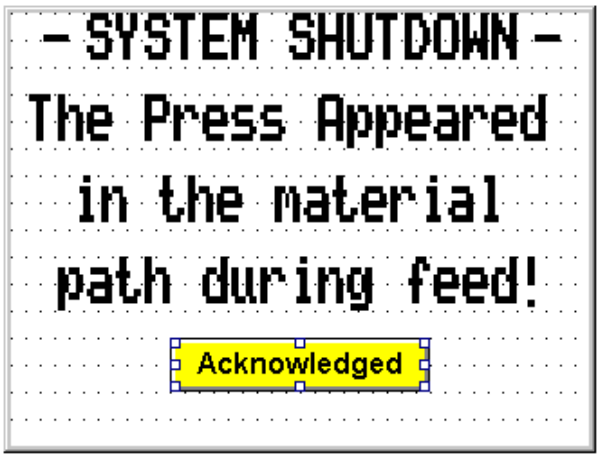
To revert back to the previous display the Operator would depress **Done Here**.

To leave or exit the **AUTO FEED MODE** the Operator would depress the **Exit Auto Mode** key. The current feed in progress will continue until complete then the controller will stop feeding and exit the **AUTO MODE**.

If Operating in the Digital Speed mode, the Feed Speed can be adjusted by depressing the **Inc** or **Dec** keys. This will provide adjustments in 5% increments for 5%-100% speed.

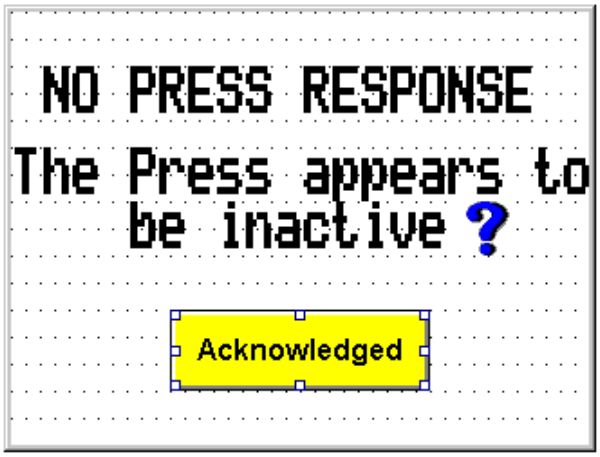
Press Problems

All information about the press is derived simply from a cam limit switch. When the press has rotated free of the material path on the upstroke, the limit switch is in one state and when the press comes into the material path on the downstroke, the limit switch is in its' alternate state. Should the feed still be in progress upon the downstroke limit, the feeder will perform an emergency stop shutdown and display the following message:



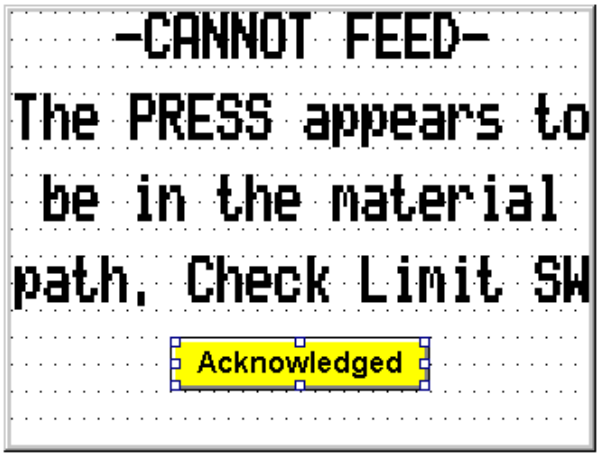
The feed speed needs to be increased so that it finishes within the Press Window.

If the feeder had been cycling but the Press stopped for some reason, again the internal timer would be expiring. Upon expiration the controller will leave the **AUTO MODE** and display the following message:



Press Problems con't

If the Press is in the down position prior to a motion request such as Jog or Single Feed, the controller will deny that request and exit that mode plus display the following message:

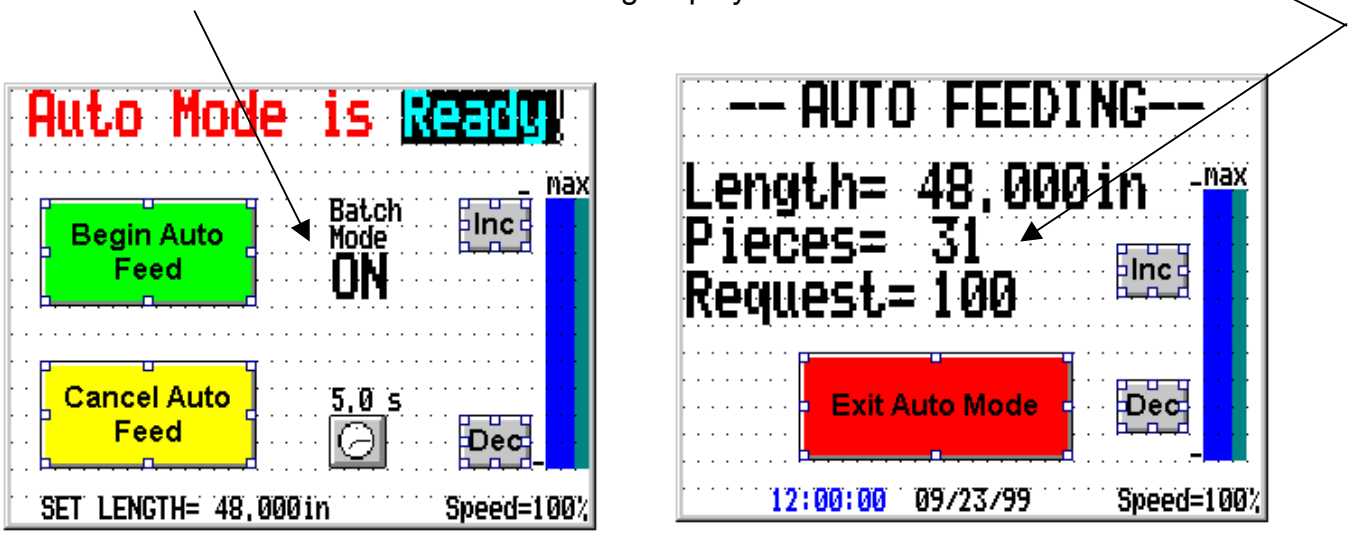


On any drive error or fault message, depressing the **Acknowledged** key will acknowledge that the Operator has seen the error and is ready to resume.

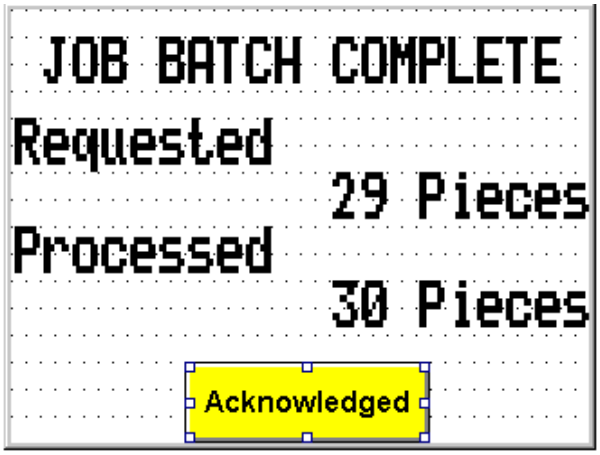
Auto Batch Mode

When Batching is enabled (and the requested pieces are greater than 0) , the controller will continue in the Auto Feed mode until that number of pieces are completed. The controller will stop Auto Feeding and indicate that the requested Batch is complete. After Operator acknowledgment, another Batch of the same quantity can be processed if Auto mode is invoked again.

When Batch Mode is enabled the Auto Feeding display will reflect the current Piece Count.



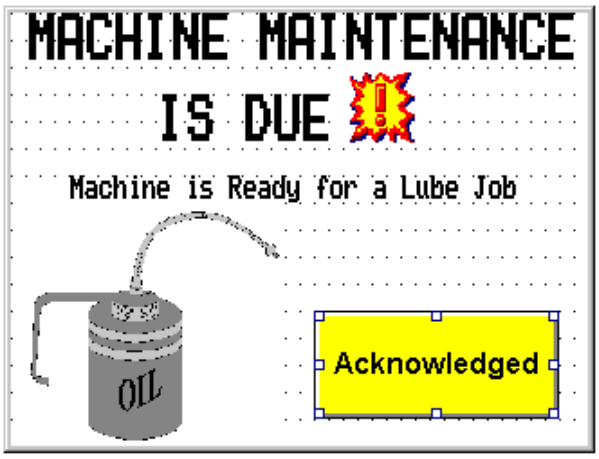
When a batch is complete the PLCIII will display:

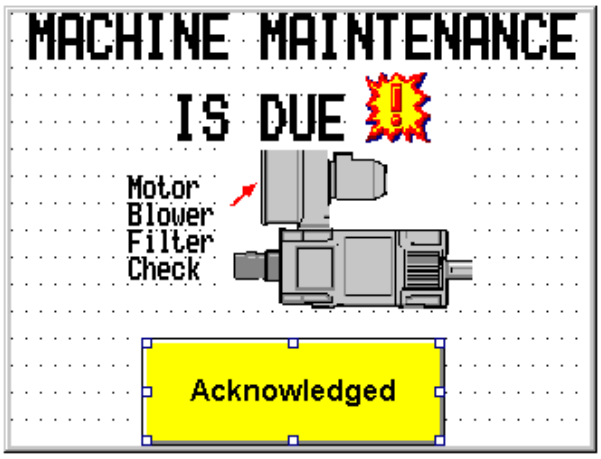


The PLCIII will wait for the Operator to depress **Acknowledged** to move on from this event.

Maintenance Alarms

There are 2 maintenance oriented alarms that could pop up when a User settable hour counter has expired for either the Lubrication alarm, or Blower Filter alarm. These alarms will appear whenever an Operator requests a new Job Setup. This should prove annoying and hopefully would prompt them to call for Maintenance. After the actual item was serviced, the Maintenance person could reset the alarm via the Internal Menu area.



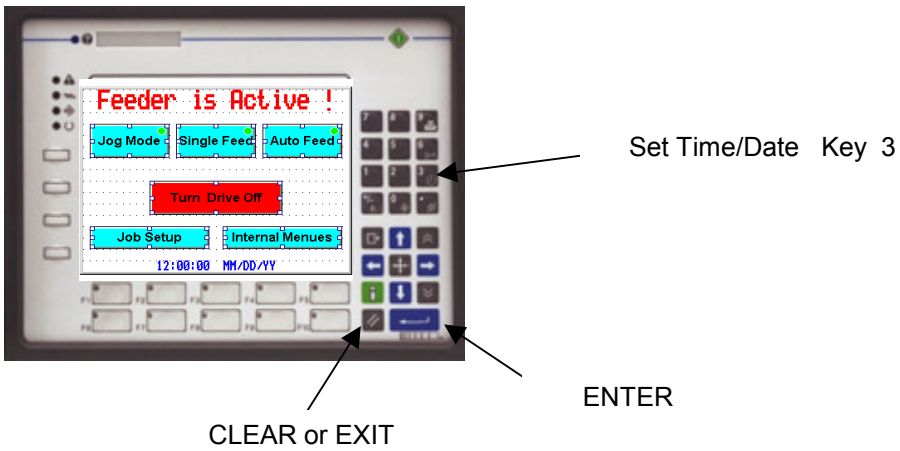


Setting Time & Date

Time and Date are maintained entirely within the Keypad/Display unit by a lithium battery. The Time and Date are not used for any time logging purposes but is there for information only. To set the Time and/or Date one can depress the 3 key to cause the Date and Time editing page to appear.

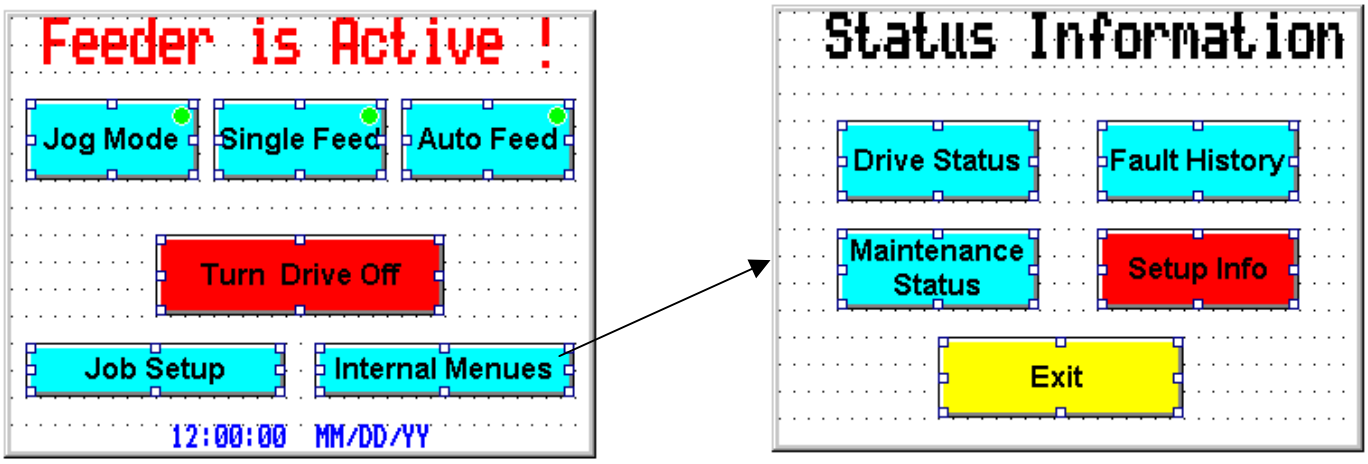
The screen will be flashing on the Month. You would use the Up or Down arrows to adjust for the current Month. If the Month is correct you would depress the ENTER (the large Blue key in the lower right). This will move the blinking cursor to the Day field. This procedure would be repeated for each field until the Time and Date is correct.

To leave the Date and Time editing page , depress the key // which is directly to the left of the ENTER key.



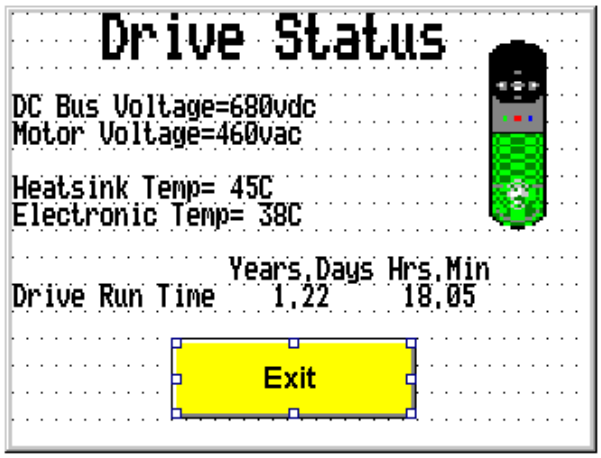
Status Information

General system status information can be viewed by requesting the Internal Menus area.



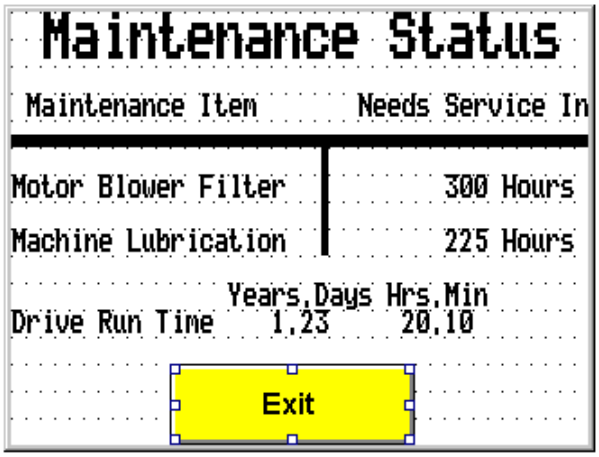
Drive Status

The Drive Status screen merely indicates the current level of the DC Bus within the Unidrive and the current motor voltage. The motor voltage will typically be low since the drive is just holding position and not in motion. Also indicated are the Heatsink and Electronic Control Board temperatures of the Unidrive and how long the Unidrive has been in a run state.



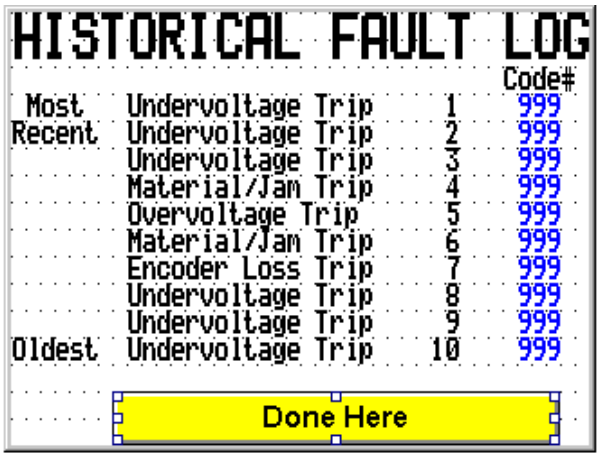
Maintenance Status

The Maintenance Status screen indicates the current state of the Maintenance Hour meters.



Historical Fault Log

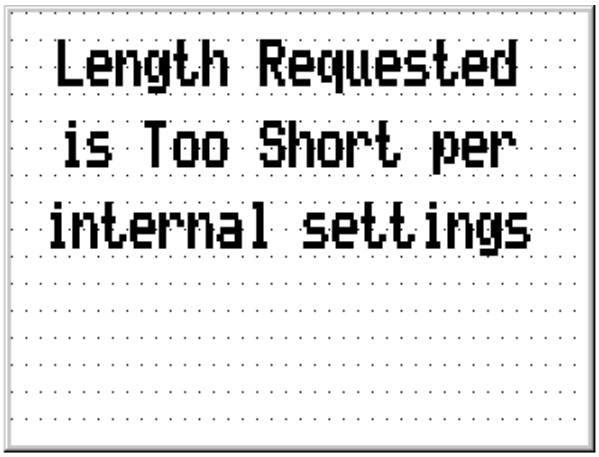
The PLC III will display a History of the last 10 Faults the Drive system experienced. These faults will be arranged in chronological order of occurrence. The most recent trips are shown first and by scrolling down (using the down arrow) older faults are displayed.

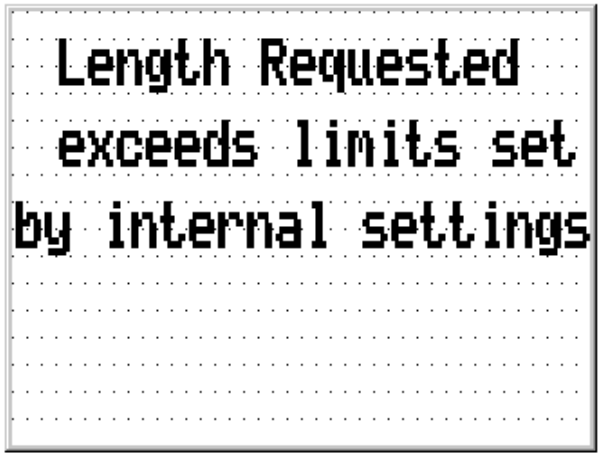


Error Messages

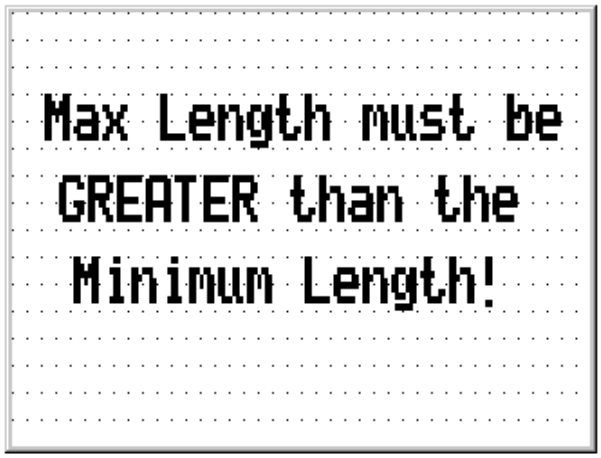
Listed below are descriptions of the various error messages that could occur based on Machine or Operator interventions.

One of the following messages will appear if the Operator attempts to enter a Feed Length that is outside the limits set per the Max and Min Length settings for the machine. (see Machine & Feed Data)



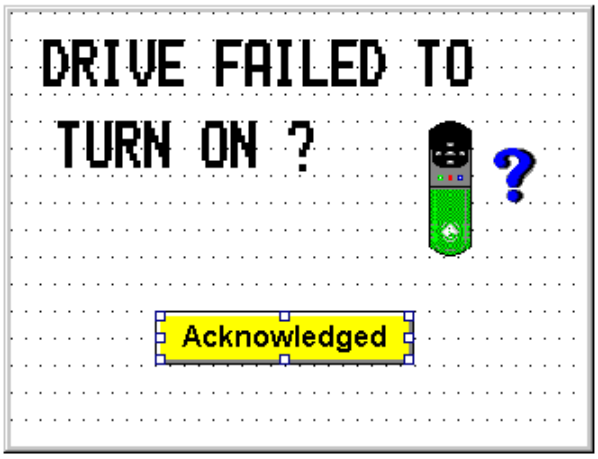


The following message would appear during setup if one would attempt to enter a Minimum Length that was greater than the Max Length setting. This message would only occur in the Machine & Feed Data setup section.

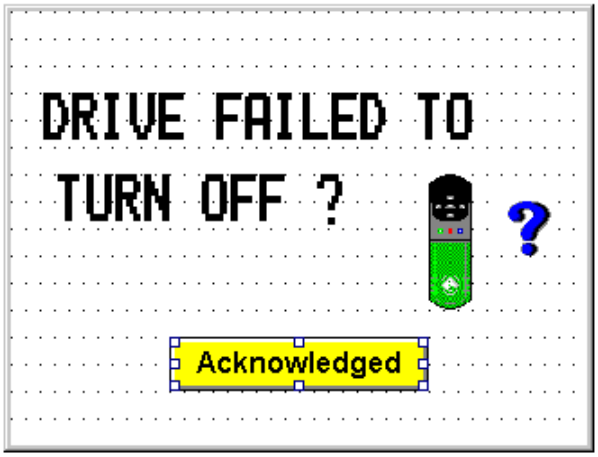


Error Messages

The following message would be displayed should the Operator command the Drive to Turn On but for some reason the Drive did not.



The following message would be displayed should the Operator command the Drive to Turn Off but for some reason the Drive did not.

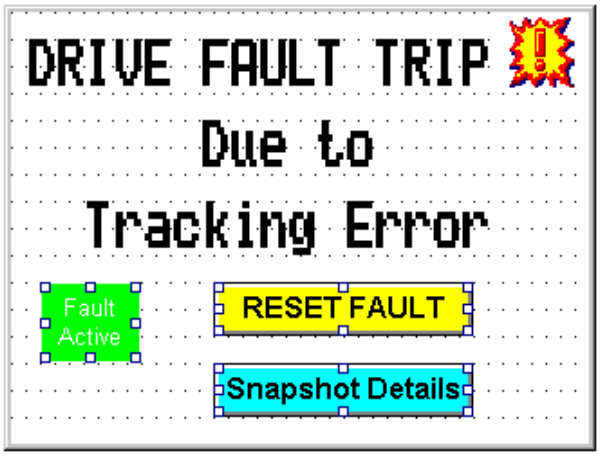


Drive Fault Trips

Upon a drive fault trip, the Operator Interface unit will annunciate the fault in English. The Operator could acknowledge and clear the trip by depressing the **RESET FAULT** key on keypad unit.

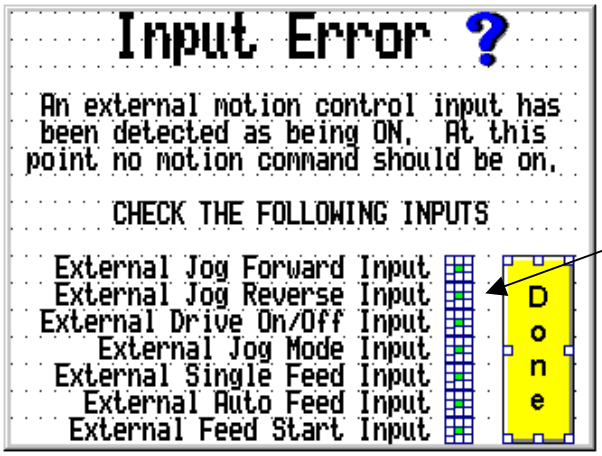
Tracking Error

A tracking error trip may occur if the feed controller doesn't follow the feed command. A failure in encoder feedback or coupling failure of some sort could cause this error trip.



Input Error

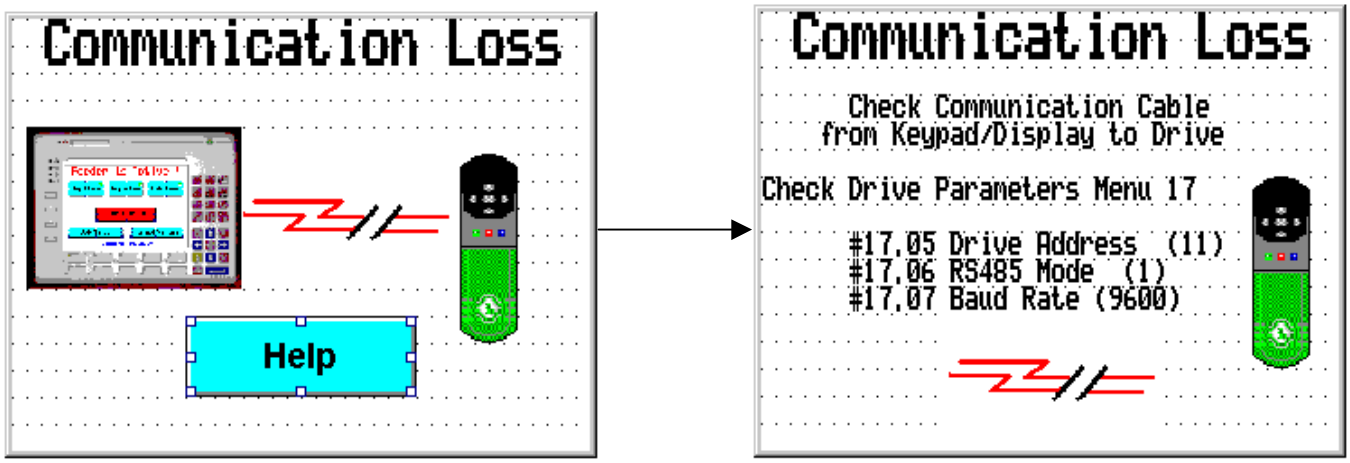
The error can occur after application of power or following a RESET. The controller examines motion command inputs and if a command is seen directly following power up the following error message will occur:



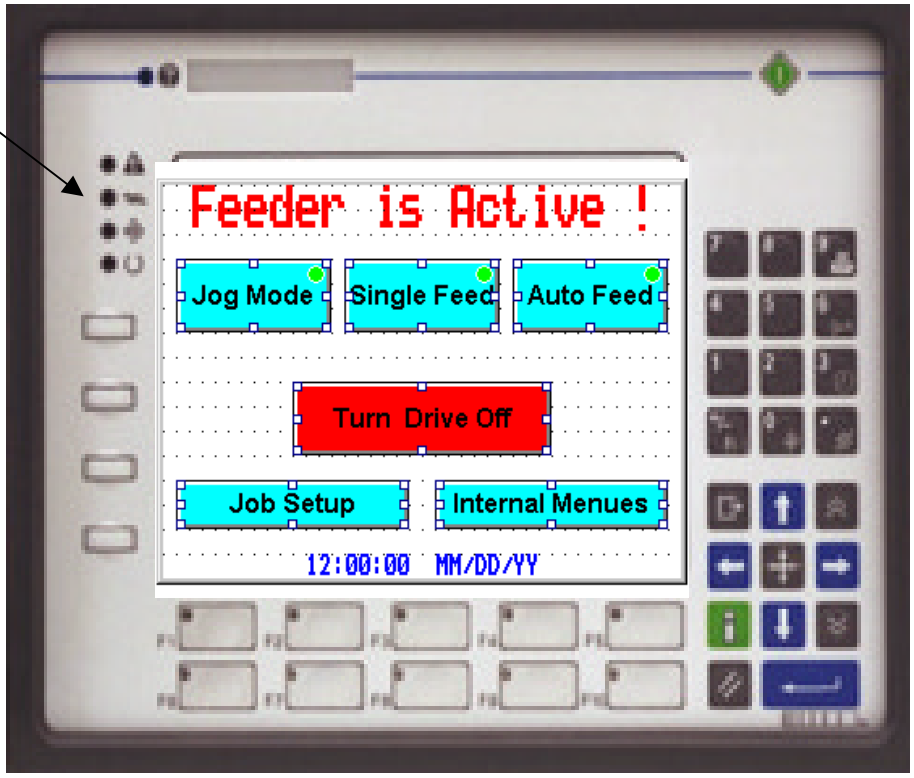
The controller detects a command input already present that could cause machine motion directly after its' power-up sequences. Further controller activity is inhibited as a safety measure until the offending input is found. One could examine the inputs using the down arrow to scroll the display down looking for an input that is ON. (This could be a result of a pushbutton that is stuck on).

Communications Loss

Should the Operator Interface Unit not be able to communicate with the UD70 Co-Processor located within the Unidrive, the following screen message will appear.



This LED will flash if there is a communication loss (normally steady green)

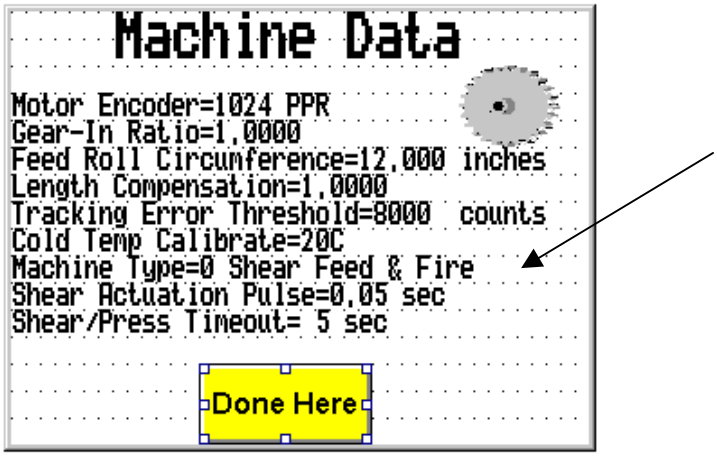


Technician's Setup and Diagnostic Section

One very critical parameter that it must know about is what basic mode of operation it is to perform, namely:

Feed and Fire
Continuous Feed

If no specific mode of operation is selected the controller will default to **Feed and Fire** and set other associated parameter settings per this mode of operation. This is settable under **Profile and Machine Data .**



For definitions of these modes see page 2.

Troubleshooting

Feeder Direction

Problem: The Feeder works correctly but goes the wrong direction.
Solution: With power off, reverse any two motor leads and exchange CHA with CHB and /CHA with /CHB

Keys

Problem: Mode Control Keys don't seem to work from the keypad unit
Check: Whether those keys are enabled. (See Mode Control)
If they are enabled, check the actual key function using the Keypad Key Test diagnostic function (See Diagnostics)

Length Errors

Problem: There are product length variations
Solution: This problem is typically due to material slippage due a high rate of acceleration or deceleration during the feed cycle. One could try simply reducing the accel or decel time of the feed which might be ok but other materials may tolerate the higher accelerations.

There is a control option called Vary Accel w/Speed that could help with this situation. When this parameter is 1, the accel and decel slope will vary with the requested feed speed. As feed speed is reduced, the accel and decel slopes are extended proportionally. This can help eliminate material slippage by simply reducing the feed speed during operation. (See Features and Options)

Test: One can test the electronics by simply entering a feed length equal to the Roll Circumference. (Feed Roll Circumference is a parameter found in the Machine Data area within the Internal Menu). One could place a physical mark on the machine feed roll shaft and the bearing collar. Performing Single Feeds at various, the marks should line up. If the marks tend to line up this will indicate the electronics are ok. The problem must be in the mechanism (grippers, feed roll slippage, scale build-up)

Feed Rolls Overshoot

Problem: The feed rolls/ material overshoots and backs up.

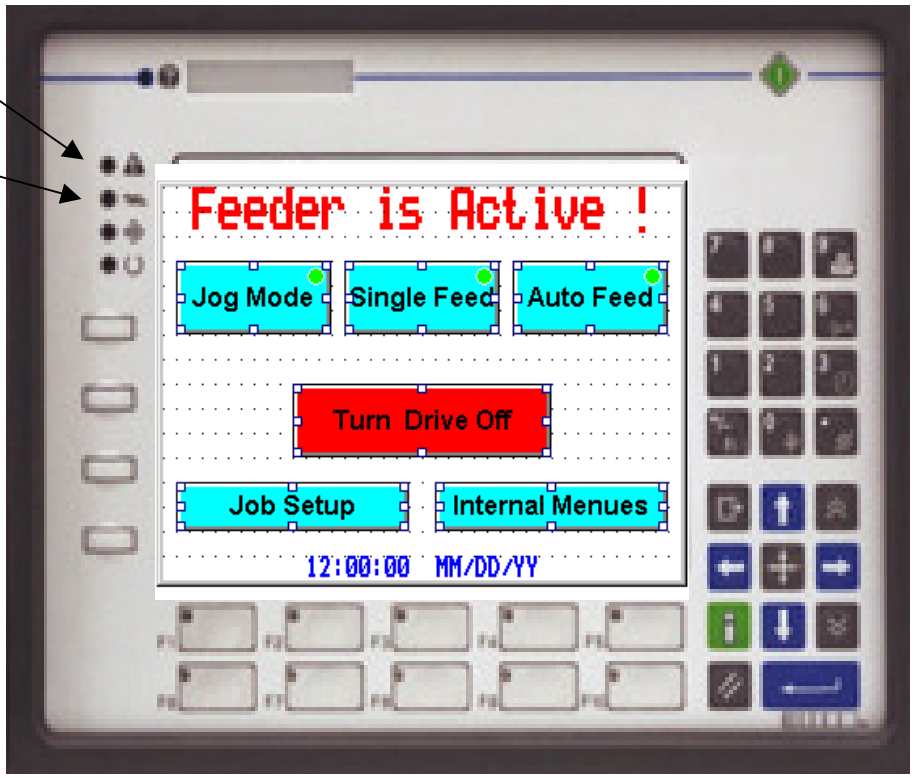
Solution: This problem is typically due to excessive rates of acceleration or deceleration during the feed cycle. One could try simply reducing the accel or decel times.

Check: Insufficient current will result in insufficient torque to achieve desired accel or decel rates. If the drive hits current limit during the feed cycle, performance will not be attainable and overshoots can occur. (See Feed Performance – Hit I-Limit) One could check and set the Motor FLA and the current limits appropriately. Caution: Excessive currents or too high of current limits settings could cause motor overheating and subsequent damage.

Operator Interface Indicator Lights

This red LED will flash if there internal battery is low .
If steady RED there is a hardware fault

This LED will flash if there is a communication loss –check cable (normally steady green)



Battery Replacement

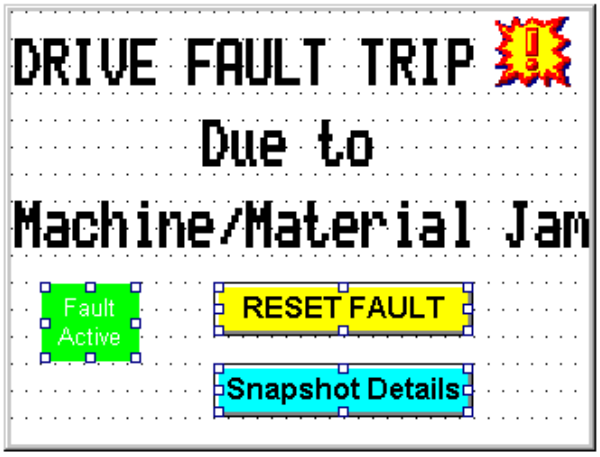
Battery Replacement

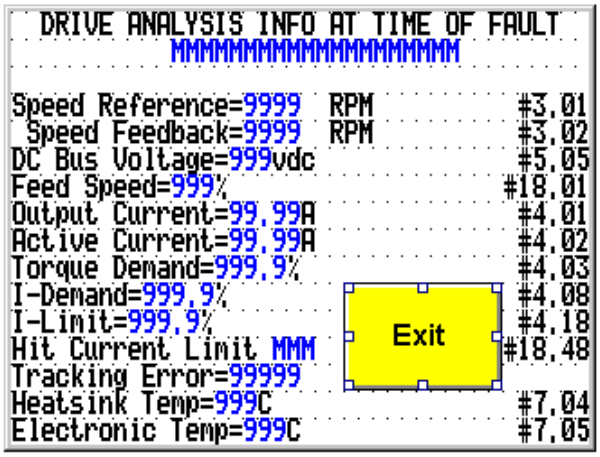
1) Remove all power from the Operator Interface
2) Remove the 2 screws securing the rear cover
3) Remove rear cover taking special care to not lose the 2 small rubber washers located beneath the cover
4) Remove the 4 screws securing the CPU section
5) Firmly grasp the metal housing around the CPU and remove, again being careful to not lose the rubber washers beneath the metal housing.
6) Remove the battery and replace with a new one.
7) Replace rear cover, verify small rubber washers have been replaced in the proper positions then replace screws
8) Apply power and check the upper left LED .

Replace only with the same or equivalent type DURACELL DL2430 3volt
Dispose of used lithium battery according to manufacturers instructions- Even used batteries can explode if shorted !

Post Fault Analysis

Upon a drive fault trip, the Operator Interface unit will annunciate the fault in English. After a drive fault, a snapshot is taken of drive parameters. Many of the critical drive parameters could be viewed by depressing **Snapshot Details.**



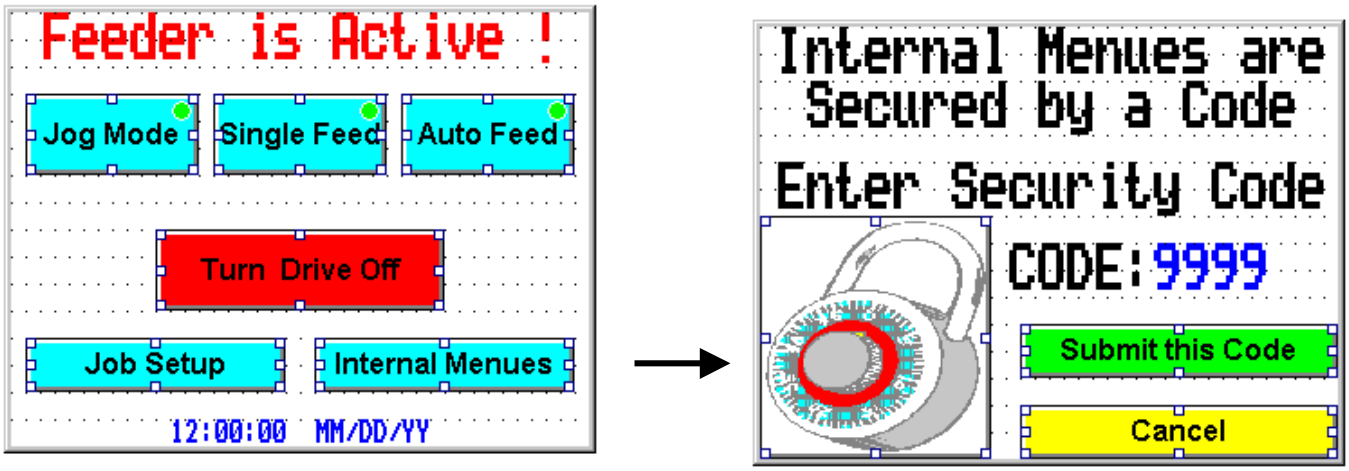


The Drive Analysis Screen (Snapshot Details) will indicate the contents of several key drive register values that were frozen at the time of the fault. This could be useful in post trip diagnostic efforts. Following a Drive Reset, all drive registers are un-frozen.

On any drive error or fault message, depressing the **RESET FAULT** key will acknowledge that the Operator has seen the error and is ready to resume.

Internal Menus

Within the PLC III there is an Internal Menu area that provides more system information and allows the PLC III to be customized for a particular machine application. To select an item from this internal menu list, one would depress the **Internal Menus** key. The display will then prompt the technician for a security code password.

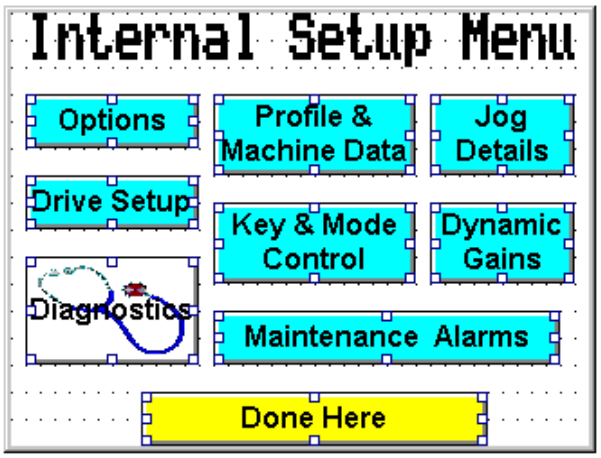


If the security code is incorrect the display will indicate:

And the controller will revert back to the previous display.

Default Security Code is 149. The stored code resides in parameter #19.18 within the drive.

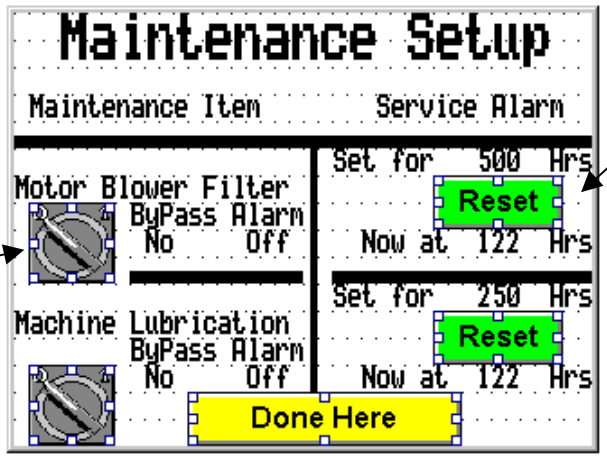
After the technician enters the correct password, the display will then display the following menu list.



Maintenance Alarms

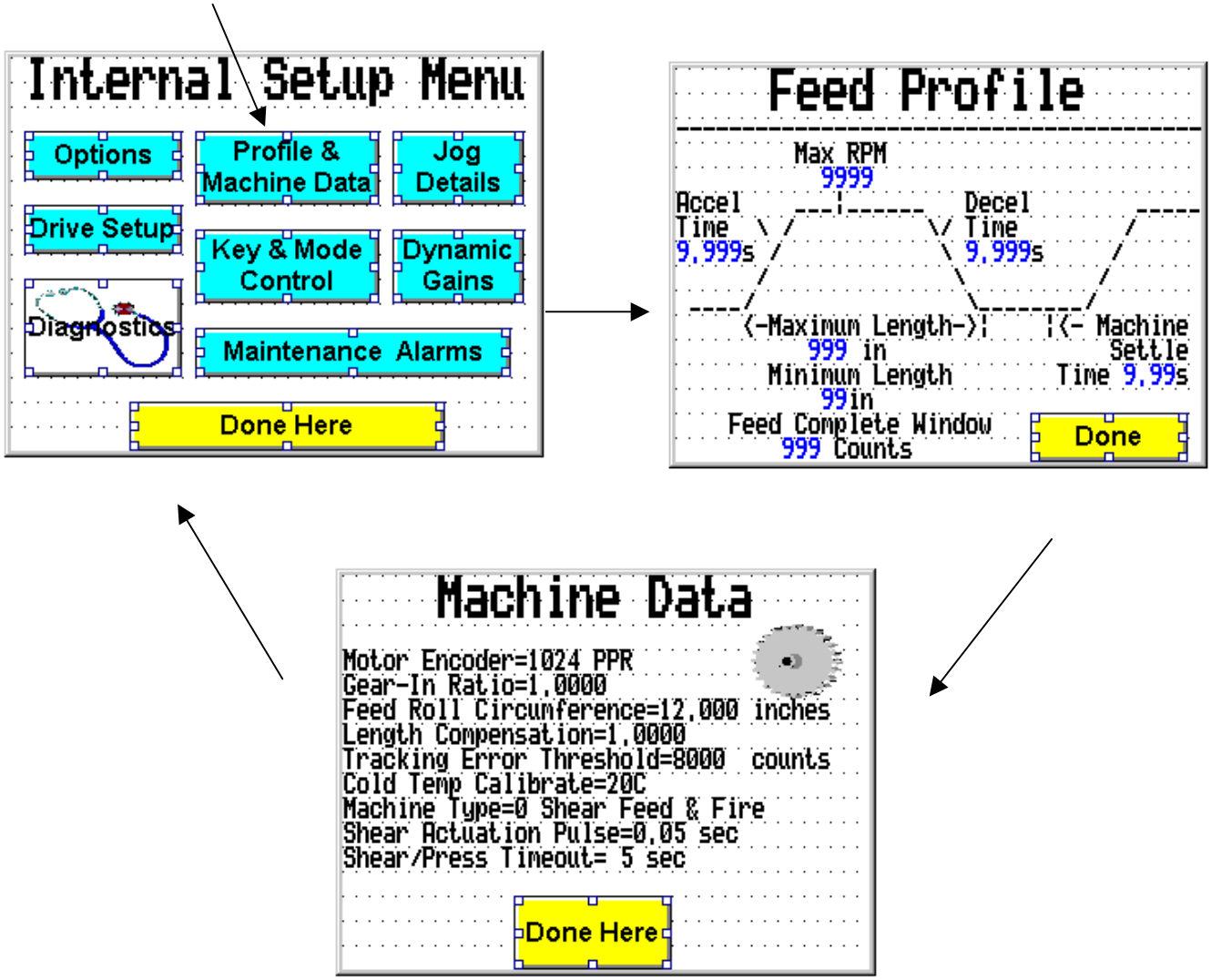
The Maintenance Technician can selectively ByPass or Use the Motor Blower Filter and Machine Lubrication Alarms. The number of hours of Drive Run time for each of these maintenance items can be independently set. If maintenance is indicated and the maintenance time setting is correct, one would only need to depress Reset to reset the timer to that amount shown.

Touch selector switch to toggle Bypass (Yes/No)



Profile & Machine Data

There are a number of machine oriented parameters that are critical for the controller to be aware of prior to it performing as a Cut-to-Length Controller. Listed below are those parameters.



Parameter Definitions

Encoder PPR : This is the number of encoder lines or PPR (pulses per revolution) for the motor mounted encoder.
Range: 512-6000 PPR **Default**: 1024

Max Motor RPM: This is the maximum calculated RPM that the motor is intended to run at during maximum speed for long feed lengths.
Range: 200-6000 RPM **Default**: 1800

Gear Ratio: This is the total feed roll to motor gear-in ratio. This would include belt/pulley, chain/sprocket or gear-box ratios.
Range: 0.1-65 **Default**: 1

Roll Circumference: This is the nominally measured circumference of the feed rolls in inches.
Range: 1-65 inches **Default**: 12 in

Length Compensation: This is a compensation multiplier to calibrate actual feed lengths produced given nameplate nominal or measured circumference errors.
Range: 0.000-1.999 **Default**: 1.000

Accel Time: This is the time that you wish the feed to reach maximum speed assuming a long enough feed length where the feed velocity profile goes from triangular to trapezoidally shaped.
Range: 0-9.999 seconds **Default**: 0.5 seconds

Decel Time: This is the time that you wish the feed to reach zero speed from maximum speed assuming a long enough feed length where the feed velocity profile goes from triangular to trapezoidal shaped.
Range: 0-9.999 seconds **Default**: 0.5 seconds

Settle Time: This is the time that you wish the feed to settle before issuing a shear output pulse in the case of Feed & Fire Operation following the feed motion. (Has no function in Continuous Press Operation)
Range: 0-9.99 seconds **Default**: 0.1 seconds

Shear Pulse: This is the duration that you wish the Shear Output pulse to be to insure reliable actuation. (Has no function in Continuous Press Operation)
Range: 0-9.99 seconds **Default**: 0.05 seconds

Max Length: This is the maximum length that this machine can accommodate or the maximum length that you wish the controller to accept.
Range: 1-1200 inches **Default**: 24 in

Parameter Definitions

Min Length: This is the maximum length that this machine can accommodate or the maximum length that you wish the controller to accept.
Range: 1-100 inches **Default**: 2 in

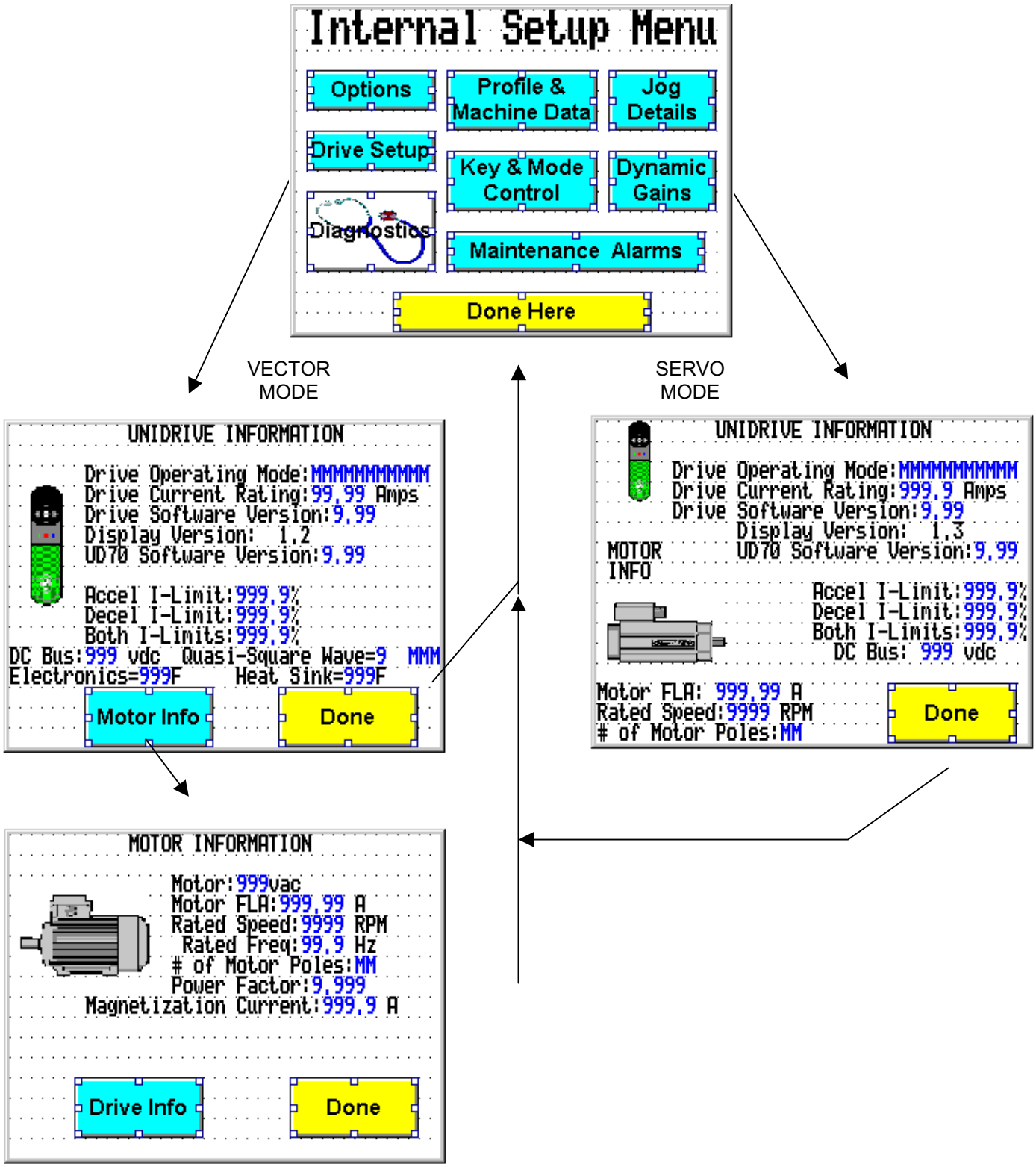
Cold Temp Calib: This parameter is used to calibrate the temperature of the Drive's internal temperature sensors. When the drive is cold (first turned on), the technician would enter the actual drive ambient temperature in Celcius into this location. This will permit both the Heat Sink and Drive Printed Circuit Board temperature to read correctly.

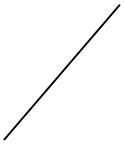
In Window: This is the number of encoder counts remaining toward the end of a feed that you wish to tolerate before the feed is considered complete enough to begin settle time.
Range: 0-100 counts **Default**: 20 counts

Track Err: This is the number of encoder counts of error that will be tolerated before The drive will trip on Excessive Tracking Error.
Range: 10 counts **Default**: 50,000 counts

BASIC DRIVE SETUP INFO

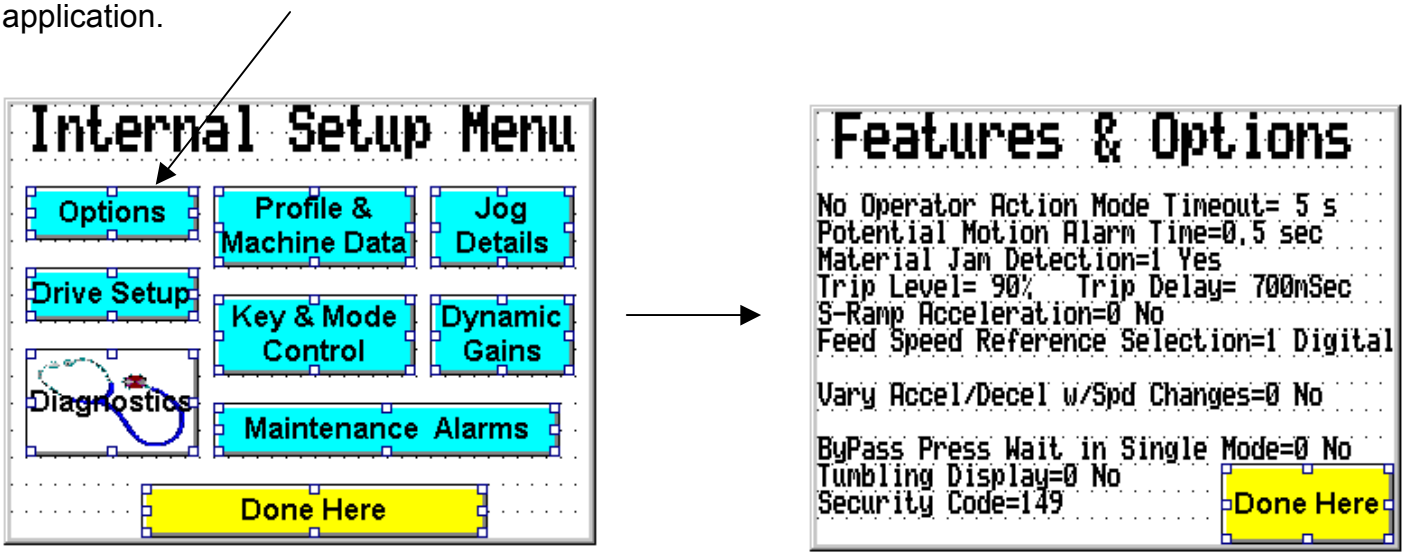
The Basic Drive Info screen simply displays some of the critical drive/motor parameters. This can be useful for quick verification of drive parameters. (Note: These are read-only parameters)





Features & Options

The Features and Options menu allows one to customize the PLCIII for a particular machine application.



Features & Options

Parameter Definitions

Shear Timeout : This is the time in seconds that the controller will allow following a shear command, or after it has seen the shear go into the down position before it automatically drop out of the active mode. It does this to promote Operator safety. **Range**: 1-30 seconds **Default**: 5 seconds

Inactivity Timeout: This is the time in seconds that the controller will allow before dropping out of the active mode due to Operator inactivity. Active modes include Jog, Single and Auto Mode. It does this to promote Operator safety.
Range: 1-30 seconds **Default**: 5 seconds

Motion Alarm: This is the duration of a timed output that can be used to alert a machine operator or nearby workers of possible Cut-to-Length machine motion. This includes Drive On, Jog, Single Feed and Auto Feed functions.
Range: 0-10 seconds **Default**: 1 second

Jam Detection: When enabled this function will attempt to detect machine jam up by monitoring motor current. When a settable value of motor current is detected, a timer is activated. When this timer expires, a 'Material Jam' trip is initiated and the controller de-activated.

0= Inactive 1= Active **Default**: 0= Inactive

Features & Options con't

Parameter Definitions

S-Ramp Enable: This control bit enables one to select either a linear acceleration and deceleration for the feed motion or an S-Ramped accel/decel.

1= S-Ramp (The Accel/Decel slopes follow an S curve shape)
0= LINEAR **Default**: 0= Linear Ramps

If materially slippage was suspected, one might set this control bit to 1 to verify this hypothesis and be a possible cure for such situations.

Feed Speed: This control bit determines whether the controller speed is to be set via an analog source (speed pot or similar) or digitally (from Operator Interface-keypad unit). When Feed Speed is set for Digital, the Operator can use the UP and Down Arrows on the Keypad/Display to adjust the Feed Speed in 5% increments. **Speed Range**: 5 -100%

1= DIGITAL (Feed Speed can be set via Operator Interface or Up/Down arrows)

0= ANALOG (Feed Speed set by analog input –usually a Speed Pot)

Default: 0=Digital Speed via Operator Interface Unit

Vary Accel w/Spd: This parameter will determine how the acceleration and deceleration velocity profile is carried out. When this parameter is 0, the accel and decel slope will remain fixed regardless of the requested feed speed. When this parameter is 1, the accel and decel slope will vary with the requested feed speed. As feed speed is reduced, the accel and decel slopes are extended proportionally. This can help eliminate material slippage by simply reducing the feed speed during operation.

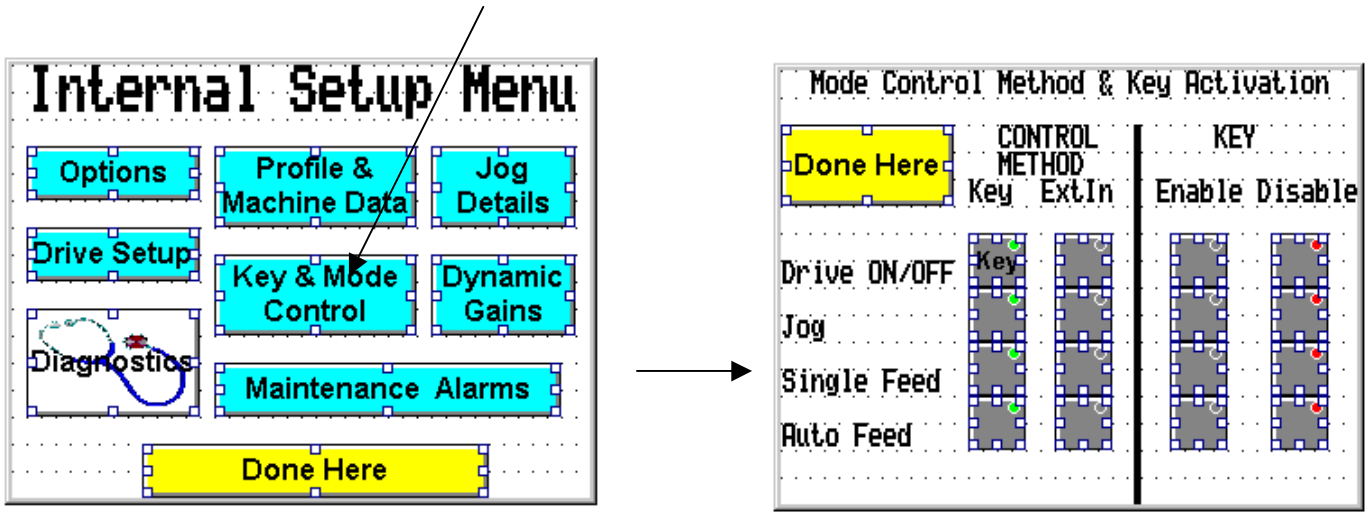
1=Vary Accel w/Speed 0= Accel remains Constant

Default: 0= Accel remains Constant

Security Code: This is the User Defined security code used to gain access to internal Setup Information. A value of 0 will defeat security.
Range: 0 – 999 **Default**: 149

Keypad Key Selection

This menu group permits one to Enable/Disable Operator keys on the Operator Interface Unit (keypad/display) . Typically, all keys would be enabled.



Notes

If a key is disabled, it would be necessary to select External Control of that function and provide an external input to activate that function.

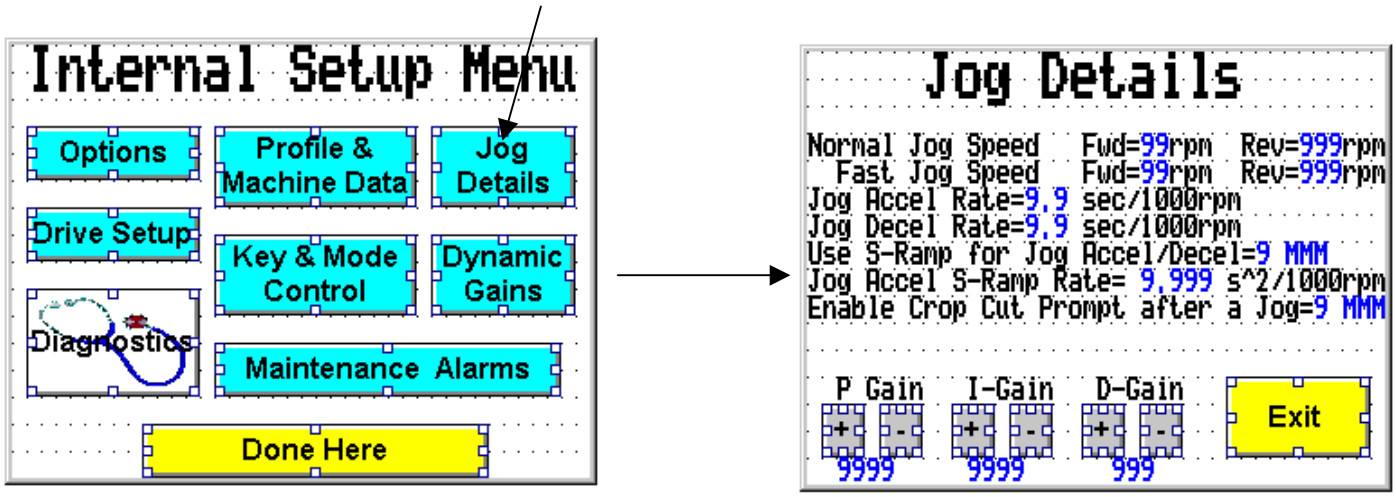
1. Regardless if a key(s) is disabled, that key function is overridden by the corresponding externally controlled mode.

2. If a mode (Jog, Single, Auto or Drive On/Off) is being externally controlled, those mode controlling keys have no function. Prompting displays will change according to whether the mode is being controlled by keys or is externally controlled.
   References to Mode deselection will not be seen on screens where modes are controlled externally.

   When modes are controlled externally: **EXTERNAL** will appear near that key function for that mode as a reminder that that function is not being controlled by that key but rather through an External Input.

Jog Speeds/Rates

This menu group permits one to adjust the various Jog details such as speeds, accel and decel rates and other associated functions concerning Jog moves.



Parameter Definitions

Jog P-Gain : This is drives speed loop proportional gain when operating in the Jog Mode.
Range: 50-9999 **Default**: 600
This parameter can also be changed through #18.20 in the drive.

Jog I-Gain : This is drives speed loop proportional gain when operating in the Jog Mode.
Range: 50-9999 **Default**: 100
This parameter can also be changed through #18.21 in the drive.

Jog D-Gain : This is drives speed loop proportional gain when operating in the Jog Mode.
Range: 0- 500 **Default**: 0
This parameter can also be changed through #18.22 in the drive.

Std Jog Fwd : This is the Normal (standard) Jog Forward speed in RPM
Range: 5-50 **Default**: 10 RPM

Std Jog Rev : This is the Normal (standard) Jog Reverse speed in RPM
Range: -50 to -5 **Default**: -10 RPM

Fast Jog Fwd : This is the Fast Jog Forward speed in RPM
Range: 5-999 **Default**: 30 RPM

Jog Speeds/Rates

Parameter Definitions

Fast Jog Rev: This is the Fast Jog Reverse speed in RPM
Range: -999 to -5 **Default**: -30 RPM

Accel Rate : This is Jog acceleration rate in seconds/1000RPM
Range: 0.1 – 9.0 **Default**: 0.5s/1K

Decel Rate : This is Jog deceleration rate in seconds/1000RPM
Range: 0.1 - 9.0 **Default**: 0.5s/1K

S-Ramp in Jog : This makes the acceleration and deceleration in Jog an S shape. Use of the S-Ramp dramatically reduces slapping of the material and gear train wear and tear.
Range: 0-1 **Default**: 1 = Yes

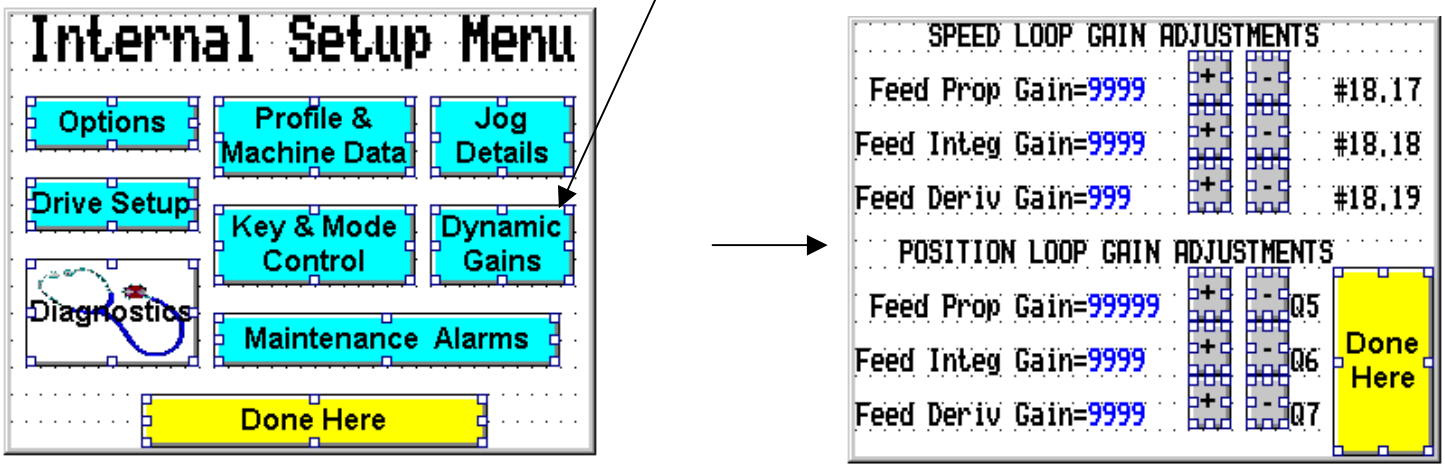
S-Ramp Rate : This value defines the S shape. It is used in conjunction with the linear accel & decel rates above. A larger value makes a softer S.
Range: 0.005 - 2.000 **Default**: 0.

Enable Crop Cut: When enabled this function will permit the Operator to perform a 'Shear Crop Cut' or 'Press Stroke' following a Jog move. After a Jog move and a deliberate exit of the Jog Mode (or following the timed expiration), the Operator is asked whether he wishes to perform a 'Crop Cut'. The Operator can answer 'Yes' and a shear/press output pulse is commanded from the controller. If the answer is 'No', Crop is skipped.

Range: 0-1 1=Enabled 0=Disabled **Default**: 0= No Disabled

Dynamic Gains

This menu deals with the Speed and Position Loop gains to obtain stable positioning response.



Parameter Definitions

FEED P-Gain : This is the speed loop proportional gain of the velocity loop in the position mode.
Range: 200-9999 **Default**: 700
This parameter can also be changed through #18.17 in the drive.

FEED I-Gain : This is the speed loop integral gain of the velocity loop in the position mode .
Range: 0-9999 **Default**: 2
This parameter can also be changed through #18.18 in the drive.

FEED D-Gain : This is the speed loop differential gain of the velocity loop in the position mode.
Range: 0-500 **Default**: 10
This parameter can also be changed through #18.19 in the drive.

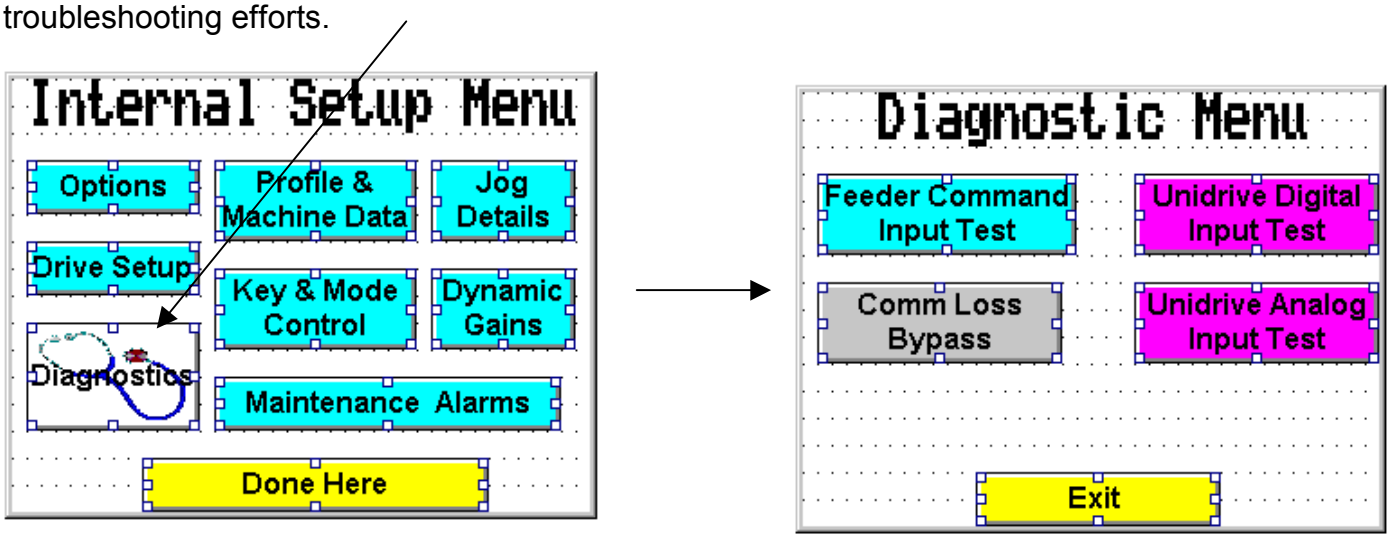
Pos P-Gain : This is the proportional gain of the position loop.
Range: 5000-32000 **Default**: 17000
This parameter can also be changed through #18.25 in the drive.

Pos I-Gain : This is the proportional gain of the position loop.
Range: 0-1000 **Default**: 1
This parameter can also be changed through #18.26 in the drive.

Pos D-Gain: This is the proportional gain of the position loop.
Range: 0-500 **Default**: 10
This parameter can also be changed through #18.27 in the drive.

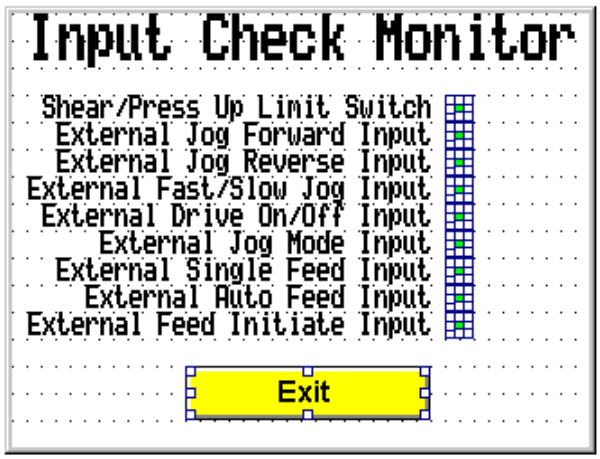
Diagnostics Tests

Built-in to the PLC III Cut-to-Length system is a series of Diagnostic tests. These tests are intended to be **static** tests. In other words, these tests are to be carried out only when the machine is not being run and all personnel is clear of the machine. These tests can be helpful in overall system troubleshooting efforts.



External Command Monitor

The External Command Monitor test screen is intended to help diagnose a faulty input to the PLC Feeder system. This diagnostic merely monitors the various inputs to the control system and indicates the state of that input function. In this manner, broken wires, faulty switches and other associated hardware can be determined and rectified.



Caution :

During this diagnostic test, inputs are in a scan only mode and machine motion should not occur. Nonetheless these tests are to be carried out only when the machine is not being run and all personnel is clear of the machine.

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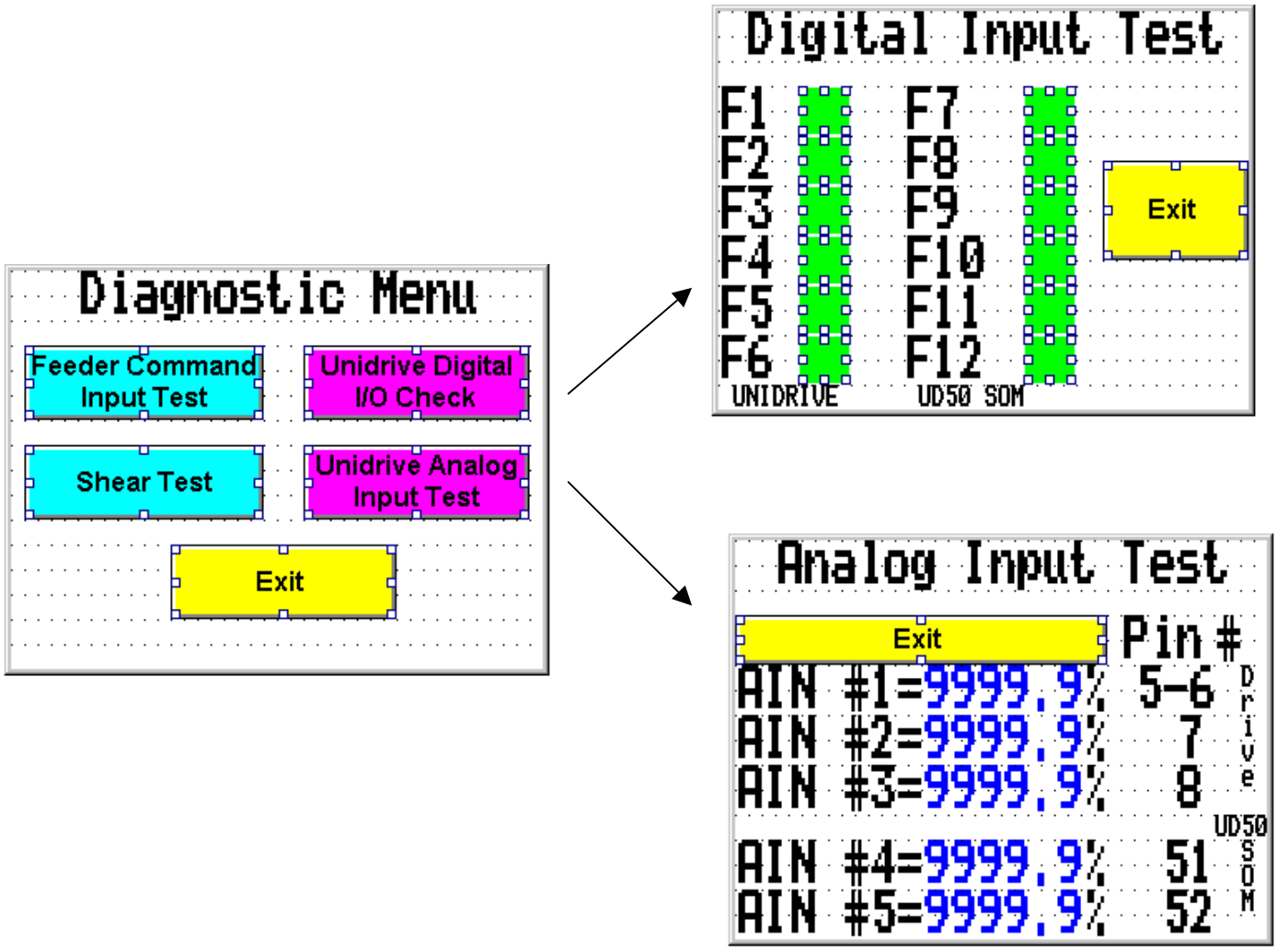
Digital Input Test

The digital input diagnostic test merely monitors the various inputs to the drive and its' optional Extended I/O Module (UD50) and indicates the state of that input function. In this manner, broken wires, faulty switches and other associated hardware can be determined and rectified.

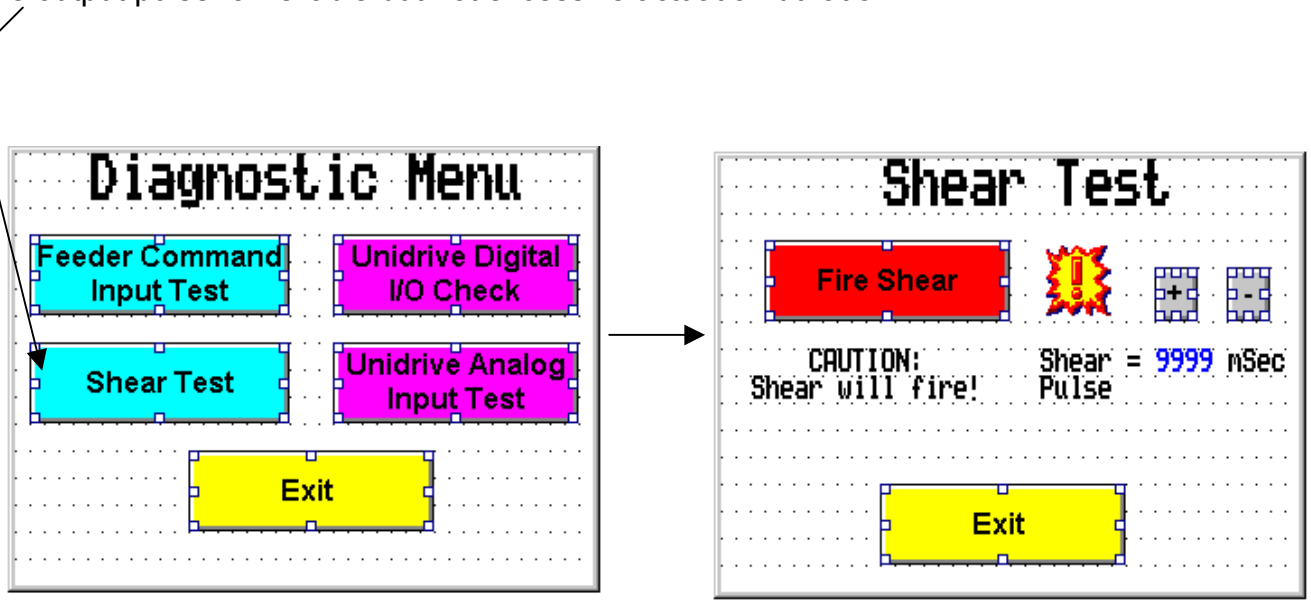


Analog Input Test

The Analog Input diagnostic test merely monitors the various analog inputs to the drive and its' optional Extended I/O Module (UD50) and indicates the state of that input function. In this manner, broken wires, faulty switches and other associated hardware can be determined and rectified.

Shear Output Setup

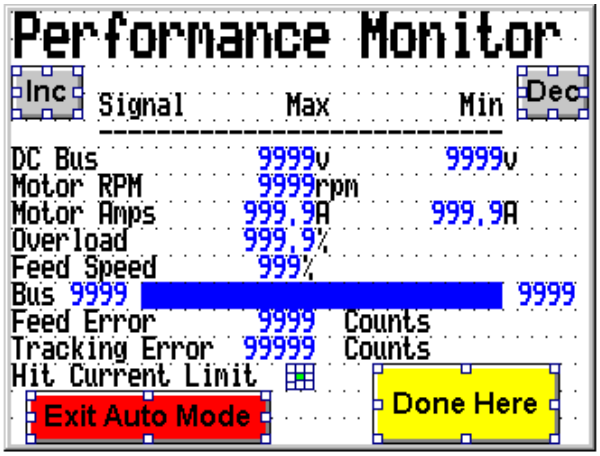
For Shear Feed systems, a setup utility is available to help calibrate the Shear Actuation Output duration. This utility will allow one to repetitively "Fire (actuate) the Shear", and adjust the duration of the output pulse for reliable but not excessive actuation duration.



Other Special Features

Performance Monitor

During the Auto Feed cycle, it is possible to monitor pertinent active drive information for each feed. While feeding in the Auto Mode, one could depress the **FEED INFO** key to obtain this additional information.



To leave or exit the Performance Monitor screen one would depress the yellow **Done** key to resume from the previous display.

To leave or exit the **AUTO FEED MODE** while looking at the Performance Monitor, the Operator would depress the **Exit Auto Mode** key. The current feed in progress will continue until complete then the controller will stop feeding and exit the **AUTO MODE**.

Performance Monitor con't

Display Field Definitions

DC BUS: This display will indicate the Maximum and Minimum excursions of the DC Bus within the drive. This can be useful to Field Technicians in determining maximum machine duty cycles and production rates.

Motor RPM: This display will indicate the Peak RPM that the motor achieved during the last feed cycle.

Motor A: This display will indicate the Maximum and Minimum motor amps that occurred during the acceleration and deceleration phase of the last feed cycle.

Overload: This display indicates the value of the Overload register as feed cycles occur. This register will typically start out low and steadily increase but eventually stabilize at some steady state value. If it continues to climb the drive will trip on Ixt Overload. (Overload in Unidrive Manual)

Feed Speed: This display simply indicates the current setting of the Feed Speed in percent

Bus: This display will indicate the Maximum and Minimum excursion of the DC Bus and represent the excursion as a Bar Graph.

Feed Error: This display will indicate the Feed Error in feed counts.

Hit I-Limit: This display will indicate whether the drive went into Current Limit during the feed. If the drive goes into current limit it will be unable to follow the feed reference profile. As a result, product overshoot and feed errors while most likely occur. If the motor/drive cannot produce more torque/amps, one could try reducing the feed accel and/or decel times or select : Vary Accel w/Spd. This function will automatically reduce the accel and decel rates as the feed speed is reduced.

Tracking Err: This is the peak value (absolute value) of the position loop tracking error during the feed.

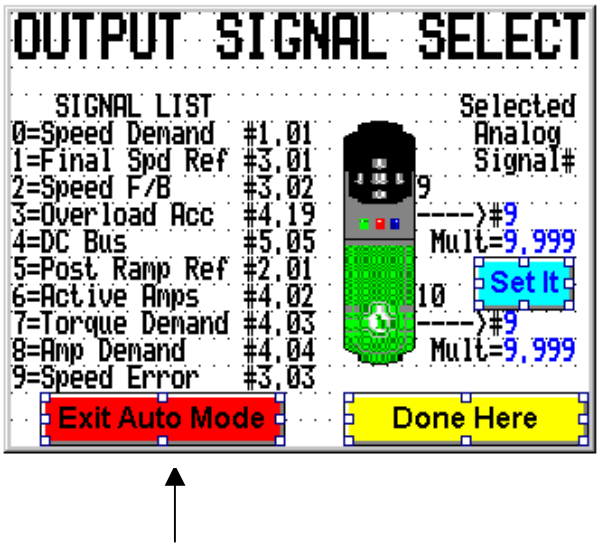
To leave or exit the **AUTO FEED MODE** while looking at the Performance Monitor, the Operator would depress the **MODE OFF** key. The current feed in progress will continue until complete then the controller will stop feeding and exit the **AUTO MODE**.

Other Special Features

Scope Output Signal Selector

Another built-in feature within the PLC III is the Output Signal Selector. This feature merely offers the field technician a convenient way of setting the analog outputs of the Drive to common internal signals while Feeds are occurring in the Auto Mode. These are signals that he may wish to monitor with a scope or strip chart recorder in order to observe overall feed performance and permit optimal machine setup.

To use the Output Signal Selector while feeding in the Auto Mode, one could depress the **SIGNALS** key on the Operator Interface Panel.



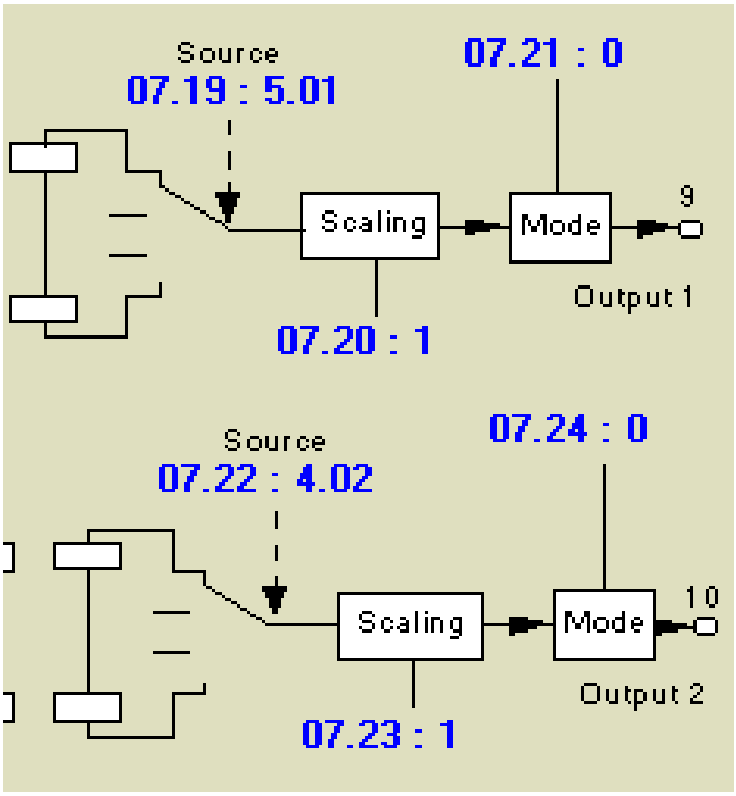
To leave or exit the **AUTO FEED MODE** while looking at the Output Signal Selector, the Operator would depress the **Exit Auto Mode** key. The current feed in progress will continue until complete then the controller will stop feeding and exit the **AUTO MODE**.

Scope Output Signal Selector con't

For this function to be utilized, the analog output(s) that you wish to monitor signals from must not be in use for system purposes. These outputs are located on Pin 9 and 10 of the small signal terminal strip of the Unidrive.

It may be necessary to adjust the scaling for suitable display.

Output Terminal	Scaling Multiplier	Range
#9	#7.20	0-4.000
#10	#7.23	0-4.000



Terminal #9

Terminal #10

Feeder
Parameters

Location	Function	Name	Type	Range	Default	Units	Description
#18.34	Output	OverallCycle	bit				Feed Start-Shear Down Indicator
#18.35	Output	BatchComplete	bit				Batch Complete Indicator
#18.36	Output	Feeding	bit				Feed in Progress Indicator
#18.37	Output	InSingleMode	bit				Single Feed/Piece Mode Active
#18.38	Output	InAutoMode	bit				Auto Feed Mode Active
#18.39	Output	InJogMode	bit				Jog Mode Active
#18.40	Output	RejectPiece	bit				Reject Piece Flag
#18.41	Output	ShearCommand	bit				Shear Command Output Pulse
#18.42	Output	MotionAlarm	bit				Motion about to begin !!!
#18.43	Output	FastJog	bit				Fast Jog Select
#18.44	Output	English/Metric	bit				0=English, 1= Metric
#18.45	Output	Settle Marker	bit				Set during settle time
#18.46	Input	EnableJog Keys	bit				Enables Jog Keys on keypad
#18.47	Input	Enable Drive Keys	bit				Enables the Drive On and Drive Off keys on keypad unit
#18.48	Output	Hit Current Limit	bit				Set if Current Limit hit during last feed
#18.49	Input	TrackErr Test	bit				Enables Tracking Error Test in Jog
#18.50	Input	ModeOffByPass	bit				
#19.31	Input	RollingDisplay	bit				0=Update @ EOF only
#19.32	Input	SRampFeed	bit				0=Linear 1=S-Ramp
#19.33	Input	JamDetect	bit				0=Ignore 1=Detect
#19.34	Input	Enable SingleKey	bit				Enable the Single Feed Mode Off Key
#19.35	Input	Enable Jog Keys	bit				Enable the Jog Forward and Jog Reverse Keys
#19.36	Input		bit				
#19.37	Input	ExtOnOff Cntrl	bit				Sets up for external Drive On/Off Control
#19.38	Input	ExtJog Cntrl	bit				Sets up for external Jog Control
#19.39	Input	ExtSingle Cntrl	bit				Sets up for external Single Control
#19.40	Input	ExtAuto Cntrl	bit				Sets up for external Auto Control
#19.41	Input	FeedSpdSelect	bit				1=Analog Ref, 0=Digital Speed
#19.42	Input	AccelMethod	bit				1=Varies w/Spd 0=Constant
#19.43	Input	CropEnabled	bit				1=Enabled 0=Disabled
#19.44	Input	ExtJogFwd	bit				External Jog Forward Command
#19.45	Input	ExtJogRev	bit				External Jog Reverse Command
#19.46	Input	ExtDriveOnOff	bit				External Drive On/Off Command
#19.47	Input		bit				
#19.48	Input	ExtSingleMode	bit				External Single Mode Select
#19.49	Input	ExtAutoMode	bit				External Auto Mode Select
#19.50	Input	Feed Initiate	bit				External Feed Start Command