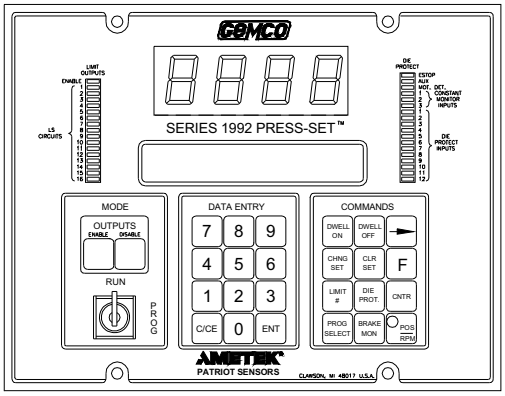
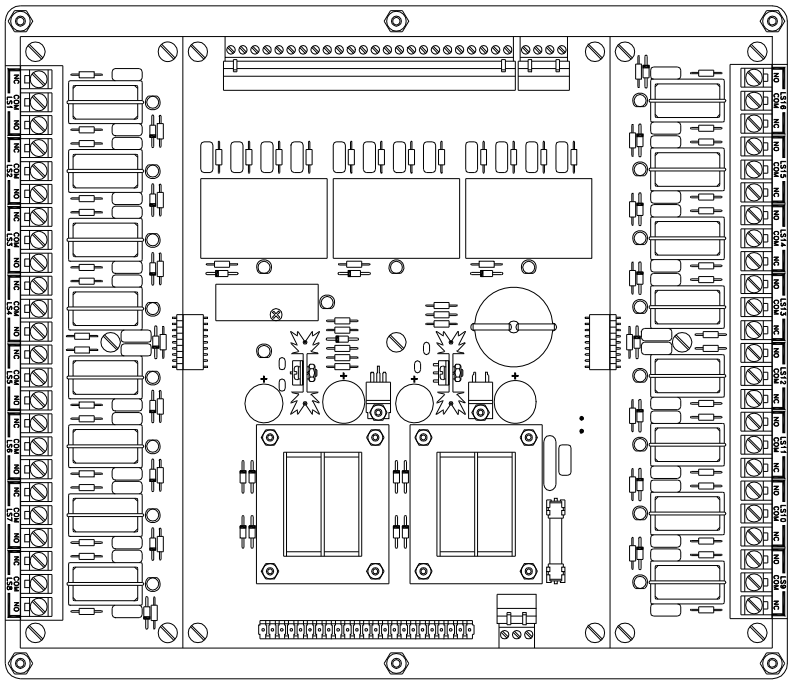
AMETEK®
AUTOMATION & PROCESS TECHNOLOGIES

Series 1992

Press-Set™

Press Automation Controller





Installation, Maintenance and Programming Manual

AUTOMATION &PROCESS TECHNOLOGIES

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Preface

This manual is for the Installation, Maintenance and Programming of the Series 1992 Press-Set. Provided are instructions for the electrician on how to install and maintain the Series 1992 Press-Set. This includes wiring the controller, output module and resolver, as well as Gemco's optional Remote Display. Also instructions for programming and calibrating the Press-Set. Chapter 10 deals with the Operations Instructions. There are four appendixes: Troubleshooting, Function Summary Chart, Catalog Numbering System, and Specifications. To further assist you a glossary is also provided at the back of this manual.

Version 1.5

AMETEK has checked the accuracy of this manual at the time it was printed. Any comments you may have for the improvement of this manual are welcomed.

Contents

Chapter 1: Hardware Overview

The Series 1992 Press-Set is a fully integrated microprocessor-based Programmable Limit Switch (PLS) that comes with two integrated keypads for convenient programming. The Press-Set was designed exclusively to control mechanical stamping presses. The Press-Set system consists of three units: controller, output module, and a resolver transducer or mechanical cam/resolver combination. This chapter describes in detail each of the system's units in the following order:

- Controller
- Output Module
- Resolver

1.1: Controller

The controller is housed in a metal case that was designed to be panel mounted. The controller consists of a motherboard (which containes all keypad and display interface components), a CPU board, an input/output board, and a power supply board.

Displays

To assist the operator, two displays are located on the controller's faceplate. An LED display provides continuous feedback of the position of the press's ram. It also can display the press's Stroke Per Minute (SPM). An LCD display provides several types of feedback, including the press's position, SPM, the program number, counter information, and the brake monitor stopping time. The LCD screen also assists you in programming by displaying messages and programmed values. Two bar graphs in the form of small LEDs are also included on the faceplate. These bar graphs provide continuous feedback on the status of die protection sensors and limit switches. See Figure 1-1.

Security Keyswitch

For security, a two-position keyswitch is provided, as shown in Figure 1-1. It can be turned to either run or program mode. The keyswitch allows entry of new data and changes to existing data when it is turned to program mode. When turned to run mode, all programmed data can be viewed but cannot be changed. The key is removable only when it is turned to run mode.

Connectors

The controller contains several connectors as displayed in Figure 1-2. These connectors include die protection connectors, serial communication and Remote Display ports, relay output connectors, resolver connectors, and the controller's L1, L2, and GND connectors. (For further information on Gemco's Remote Display, see the Series 1992 Press-Set brochure or speak with a Gemco sales representative).

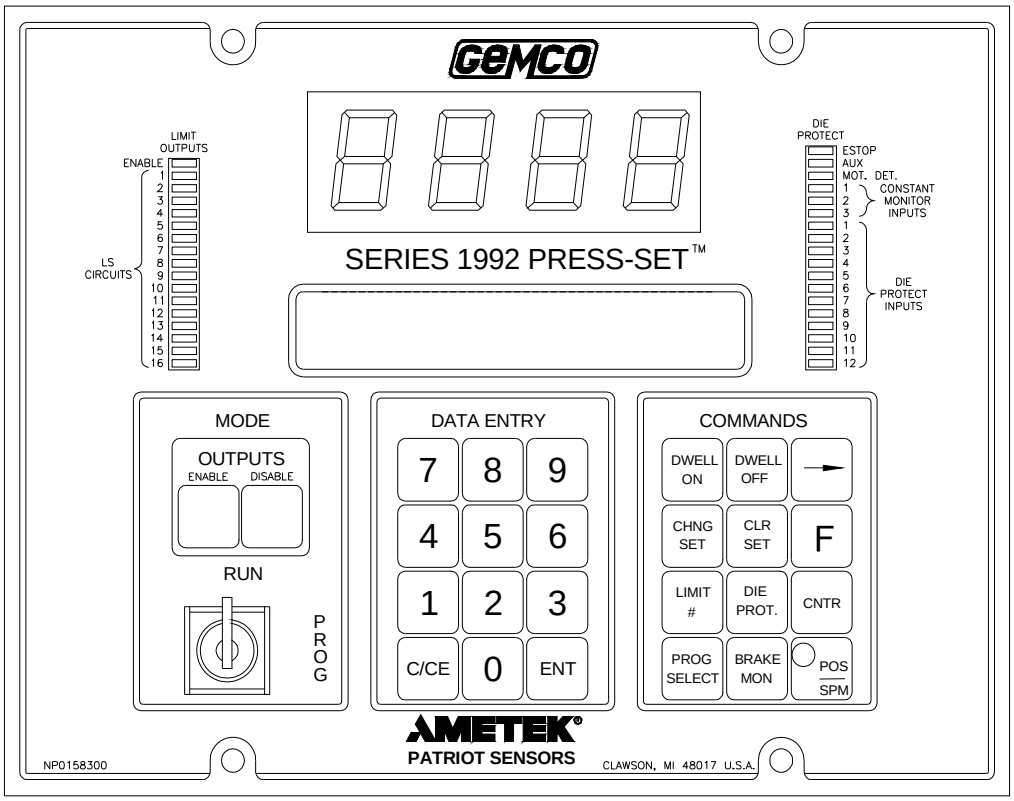


Figure 1-1 Controller

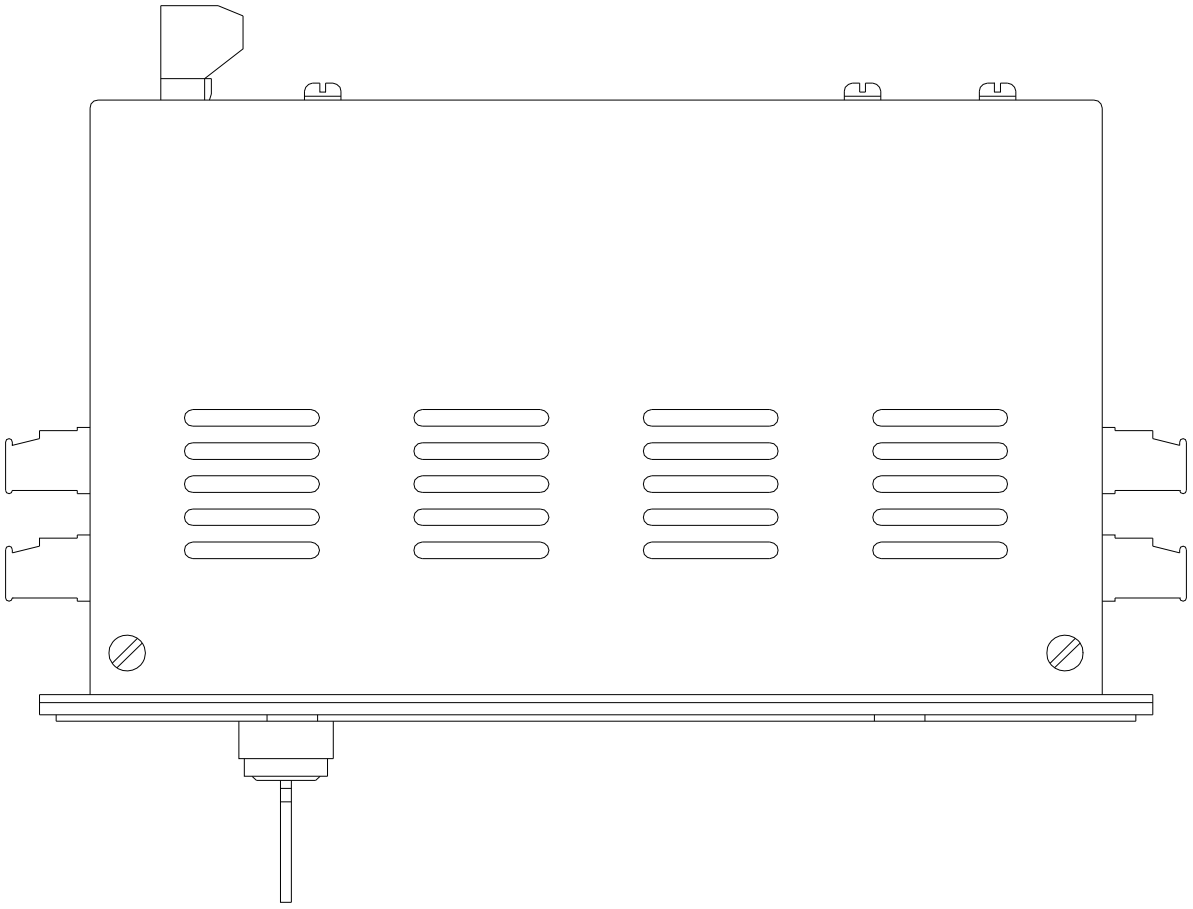


Figure 1-2 Controller Terminals

1.2: Output Module

The output module contains 16 programmable limit switches. They are typically 10A SPDT mechanical relays with resistor-capacitor snubber circuits for ElectroMagnetic Interference (EMI) protection. Solid-state AC and DC relays are also available. When wired properly, these limit switches can be programmed to interface with many types of devices found on a mechanical stamping press. Such devices could include feeders, lubricators, air blow-offs, and part transfer equipment.

The output module also has three fail-safe relays: E-STOP (emergency stop), auxiliary, and motion detect. The E-STOP relay will change state (de-energize) when either a constant monitor fault, resolver fault, brake monitor fault, speed window fault, or die protection fault (if selected) occurs. The auxiliary relay can be programmed to change state (de-energize) if a die protection fault occurs and/or a batch count is reached. The motion detect relay is typically used to detect a chain break. The motion detect is programmed to change state based on speed. A brake input monitor relay is used to monitor brake stopping time.

Connectors

The output module contains several connectors as displayed in Figure 1-3. These connectors include a terminal for the output-to-controller cable, connectors for the fail-safe relays, an input connector for the press's brake clutch solenoid, a 12 VDC output connector to power die protection sensors, an L1, L2 and GND connector to power the output module (module requires 120 VAC), and connectors for the 16 limit switches.

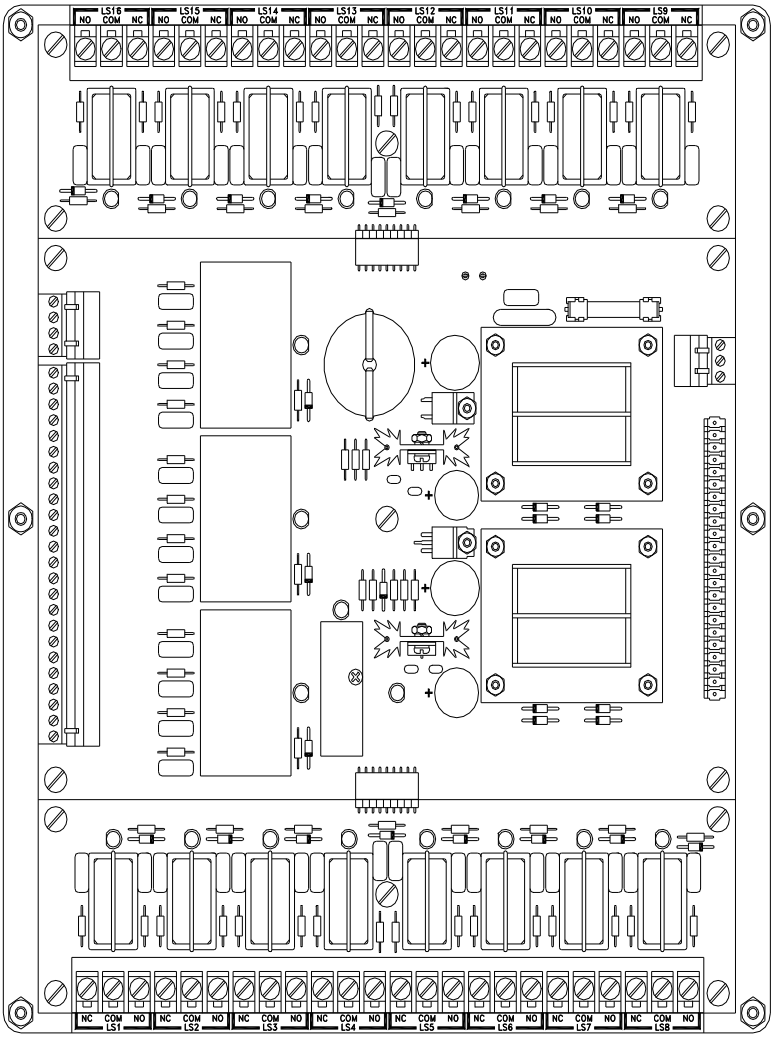


Figure 1-3 Output Module

1.3: Resolver

The Series 1992 sensing device is a synchronous resolver transducer which monitors the crank position. The resolver can accurately track the crank position, even at speeds up to 1,000 RPM or SPM (Strokes Per Minute). The mechanical cam/resolver combination allows a single sensor to be mounted off the crank. The mechanical cams, when properly installed, meet or exceed all of OSHA's Federal Register Subpart 0, 1910.217 and ANSI B11.1 safety standards as Gemco knows them, for controlling the clutch and brake limits. The resolver feeds the controller, which can then be used for all automation limits, die protection, counters and much more.

Chapter 2: Mounting and Wiring

This chapter provides instructions for mounting and wiring the Series 1992 Press-Set's controller, output module and resolver, as well as, Gemco's optional Remote Display.

Things to Consider

The Press-Set is designed for use in an industrial environment and incorporates extensive transient suppression circuitry. However, the following general installation rules should be followed that are used on all microprocessor-based equipment:

- Incoming AC lines should be from a clean power source, and lines carrying computer level signals should not be routed in the same conduit as high voltage, transient producing circuits such as variable speed drives, welders, or DC switching circuits.
- To minimize the effects of ElectroMagnetic Interference (EMI), the controller and output module should be mounted as far away as possible from the press's motor starters and control relays.
- The controller and output module should be mounted in an area free of water spray, corrosive gases, flying chips, or any other foreign matter that could cause damage to the components.
- The Press-Set units should operate in temperatures between 32° and 125°F with less than 95% relative humidity.
- When not using Gemco's output module cable assembly, the controller and output module should not be mounted more than 50 feet apart from each other.
- Conduits used for the Press-Set's wires should not contain other control wires or high voltage lines. Also, the resolver's cable should be run in a conduit by itself whenever possible.
- The resolver needs to be connected in a 1:1 ratio with the press's crank.
- If the press has a double-ended cam limit switch, it is recommended that the resolver be mounted off of the rear shaft.
- If the mechanical cam and resolver combination is used, the unit should be coupled where the existing limit switch is located or on a one-to-one relationship with the crank.

NOTE: The Press-Set's programmable limits are not control reliable for clutch/brake circuits.

2.1: Mounting

This section contains mounting instructions for the Press-Set. When deciding on where you will mount the controller and output module, you should consider mounting the units in the enclosure as far away as possible from motor starters and control relays to minimize the effects of EMI interference. Interconnecting wires should be routed to minimize EMI coupling, also.

1. Using the dimensions provided in Figures 2-1 and 2-2, drill four 3/16" holes and cut out the section of the panel you wish to mount the controller to.

   It is recommended that the controller be mounted to the press's pedestal.

2. Place the controller into the cutout.

3. Insert four screws (#8-32UNC-2B) through the controller's faceplate and the panel, and tighten these screws with four nuts.

4. Using the dimensions provided in Figure 2-3, drill six 3/16" holes into the panel you wish to mount the output module to.

   It is recommended that the output module be mounted in the press's control cabinet.

5. Secure the output module to the panel by using the six shock mount standoffs (#8-32UNC-2B) to the panel, and tighten these shock mounts with the six supplied nuts (#8-32UNC).

6. To mount a standard foot-mounted resolver, connect the resolver in a 1:1 ratio with the press's crank. If a double-ended cam limit switch exists, mount the resolver off of the rear shaft. If you are installing the mechanical cam and resolver combination, couple the input shaft where the existing limit switch is located on the press. Wire and adjust the mechanical cams in accordance with the press manufacturer's specifications. For resolver's dimensions, see Figure 2-4.

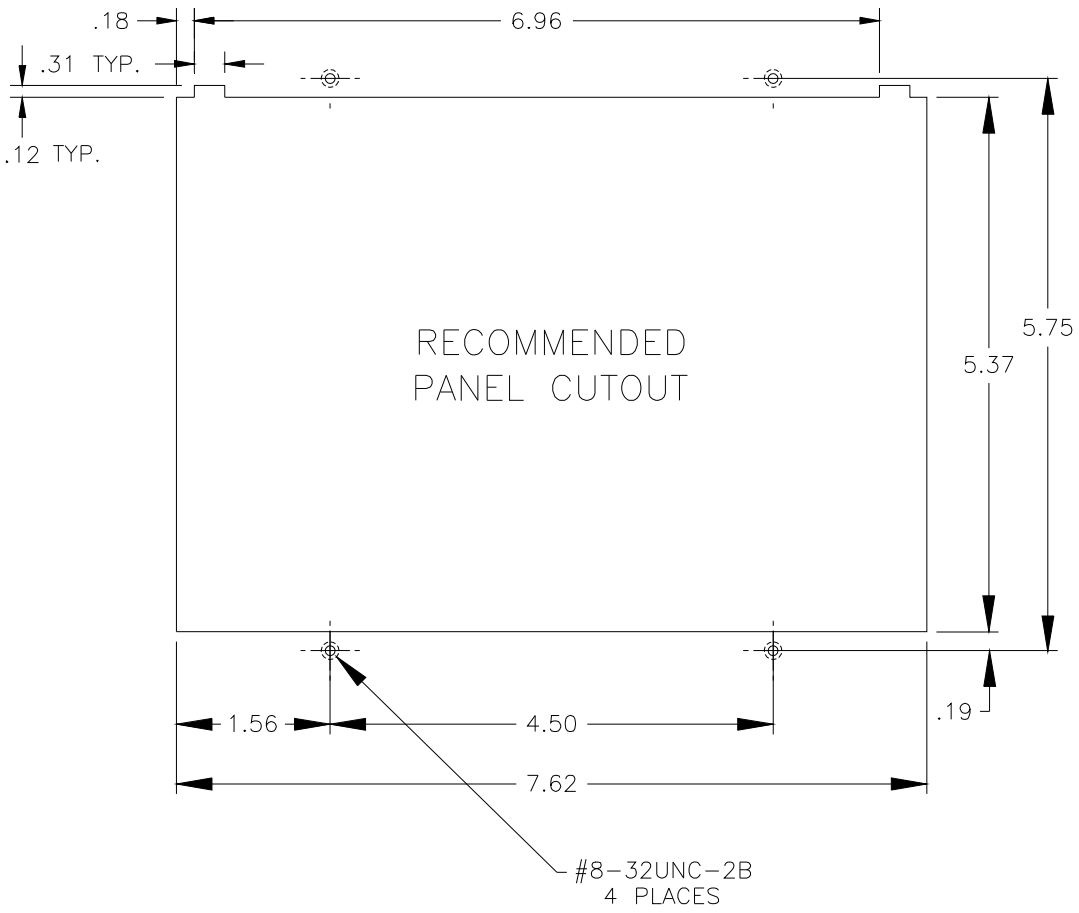


Figure 2-1 Controller's Cutout Dimensions

Figure 2-2 Controller's Dimensions

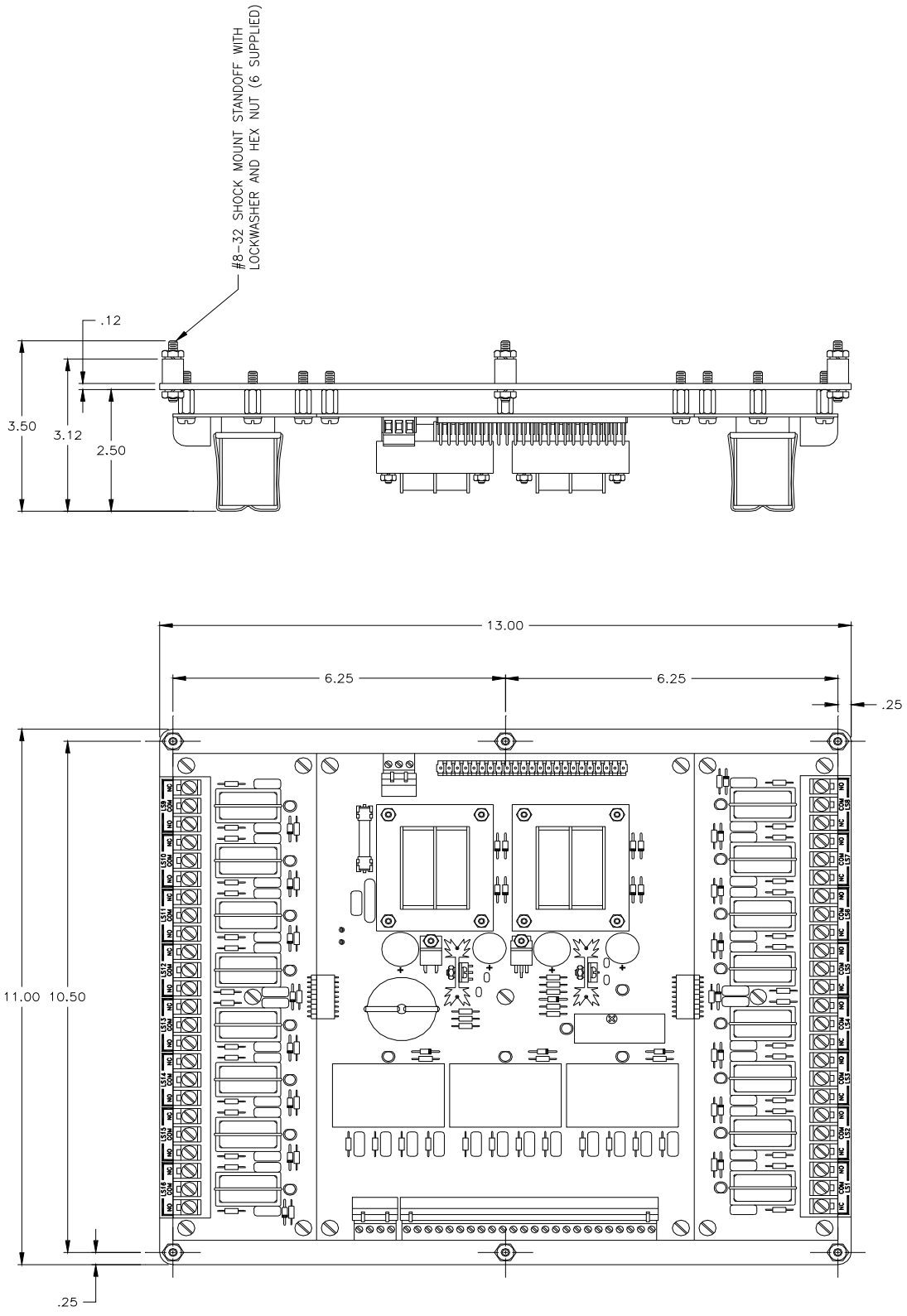


Figure 2-3 Output Module's Dimensions
Drawing #

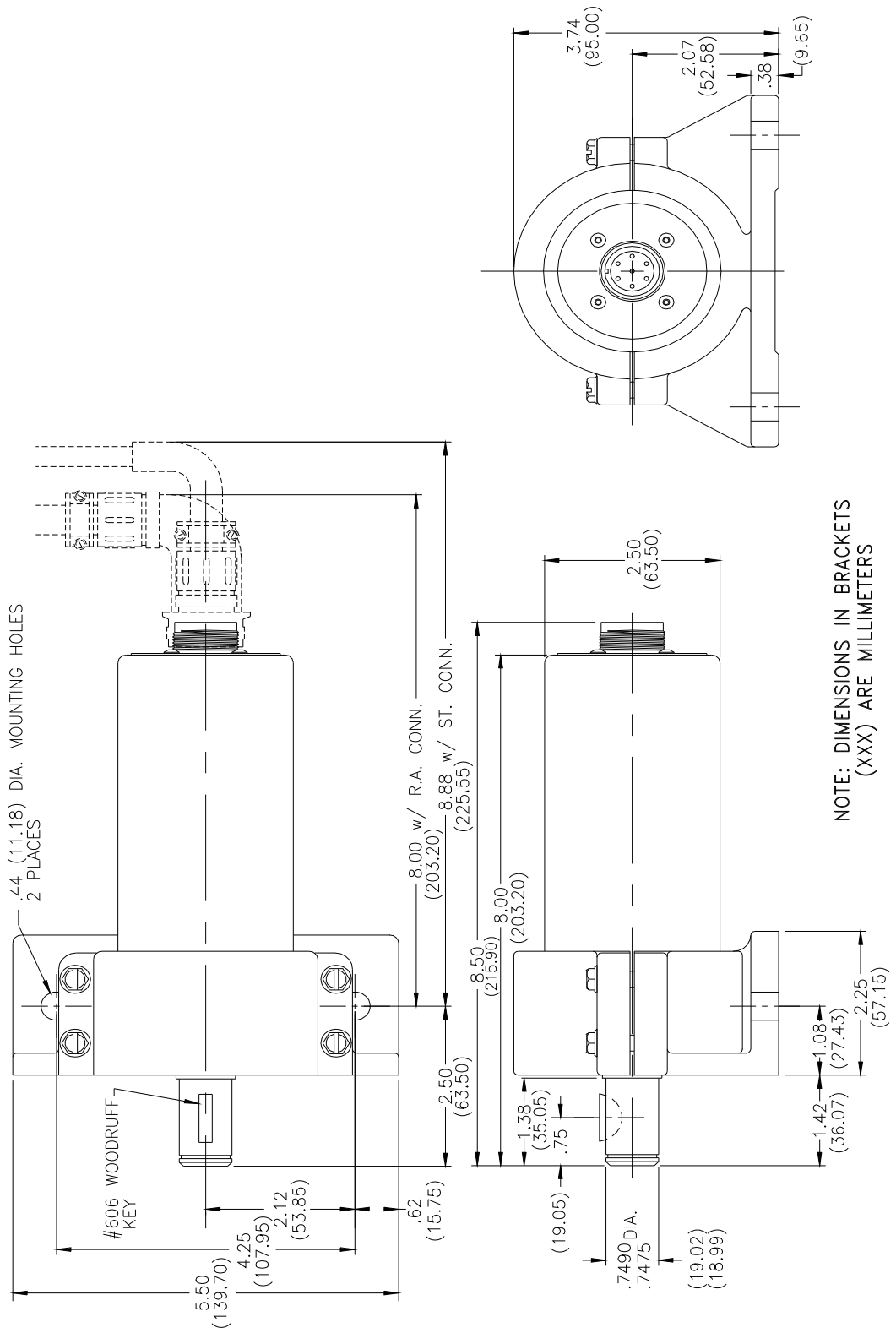


Figure 2-4 Resolver's Dimensions
Drawing #

2.2: Wiring

To assist you in wiring the Press-Set, refer to the general wiring diagram (Drawing No. E0213100) that was included with the Press-Set while performing the following steps:

1. Connect one end of the resolver cable assembly (Part No. SD0334200LXX) to the resolver's connector. Whenever possible, use a conduit for this cable.

2. Connect the other end of the resolver cable assembly to the controller's connector (see Figure 1-2).

3. Connect one end of the output module cable assembly (Part No. SD0427100) to the controller's relay output connector.

4. Connect the other end of the output module cable assembly to the output module's connector.

5. Connect an AC line that provides 120 or 240 VAC, depending on your system (see Appendix C: Catalog Numbering System), and between 50-60 Hz to the L1 and L2 connectors (TB3) for both the output module and controller. (For location of TB3, see Figure 1-3).

6. For the die protection inputs, connect the +12 VDC and ground from the output module (TB1) to the controller's +12 VDC and ground on die protection terminal. (For location of TB1, see Figure 1-3.)

Optional Wiring

The following are optional wiring connections that can be made to the Press-Set. For additional information, see the general wiring diagram (Drawing No. E0213100) that was included with the Press-Set.

- The fail-safe relays (E-STOP, auxiliary, and motion detect) can be connected to the press circuitry. Making these connections allows the user to program the controller to stop the press for certain fault conditions.

- Gemco's optional Remote Display can also be connected to the controller. A 4-pin serial cable must be used to connect the Remote Display to the controller's serial communications. See Chart 2-1 for pin connections.

Serial Cable Label	Input/Output
GND	
TXD-	Serial- (remote display connection)
TXD+	Serial+ (remote display connection)
GND	
RXD2-	Clock- (remote display connection)
RXD2+	Clock+ (remote display connection)
TXD2-	RS485-
TXD2+	RS485+

Chart 2-1 Remote Display Pinout Diagram

2.3: Wiring Schematics for Die Protection Inputs

The figures contained in this section are wiring schematics for the controller's die protection inputs. They show how several different types of sensing devices can be connected to the Press-Set. Proximity sensors used with the Press-Set must be three-wire devices and capable of working with a supply of +12VDC. These sensors can be powered by the output modules +12 VDC output, or by an external power supply. If an external power supply is used, it must supply +12 VDC. The external power supply's +12 VDC and ground must also be connected to the Press-Set's die protection +12 VDC and ground inputs.

NOTE: If you are going to use an external power supply, do not wire the +12 VDC supply from the output module to the die protection power inputs.

Figure 2-5 shows how contact-type sensors can be used for ground sensing. As shown, a whisker sensor is connected to the controller's N.O. constant monitor input. When the sensor touches something that is grounded (such as buckle in metal being fed into the press) the die protection input's voltage goes to 0 volts. This will cause a fault to occur. Other types of sensors that can be used for ground sensing are snap switches and lever arms. As shown in Figure 2-5, these types of devices can be connected to one of the controller's 12 die protection inputs and ground.

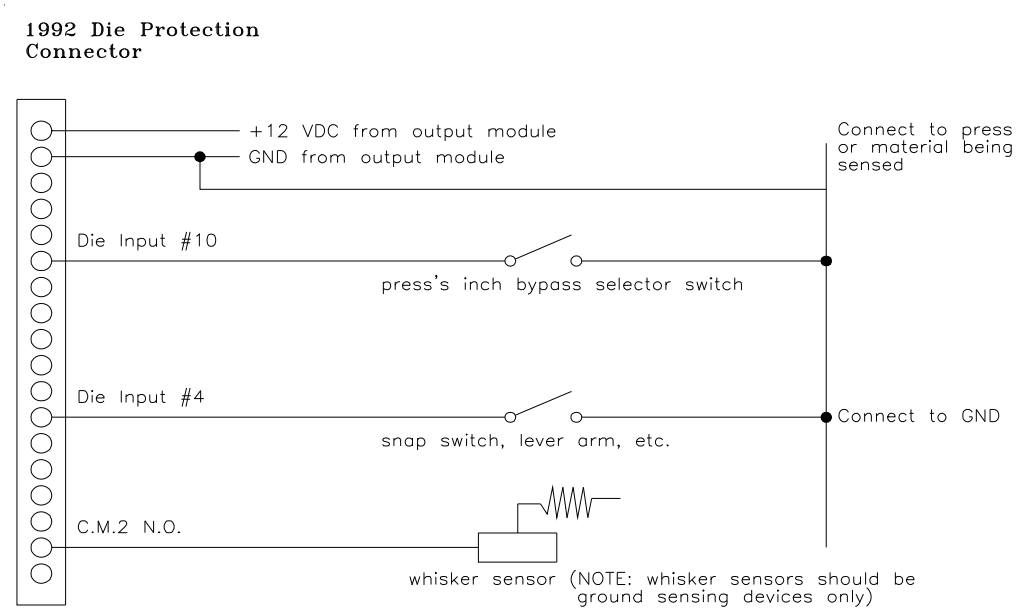


Figure 2-5 Ground Sensing Sensors

NOTE: When using the inch bypass function, the press's inch selector switch must be connected to die protection input #10. This must be a dry contact. (See Bypassing Speed Compensation While in Inch Mode in Section 6.1: Speed Compensation).

Figure 2-6 shows how sensors can be used as voltage sensing devices. As shown, a sensor is connected to one of the controller's die protection inputs and the +12 VDC input. When the device senses something, it will source +12 VDC to the die protection input.

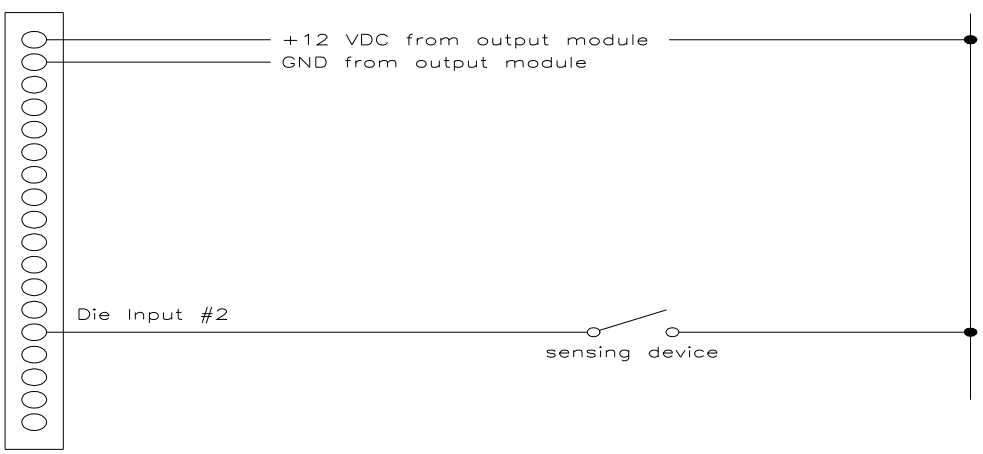


Figure 2-6 Voltage Sensing Device

Figure 2-7 shows sinking or sourcing sensors wired to the Press-Set. Used as a sinking device, the device sinks the die protection input to 0 volts when something is sensed. Used as a sourcing device, the device sources +12 VDC when something is sensed. Examples shown in Figure 2-7 are three-wire devices.

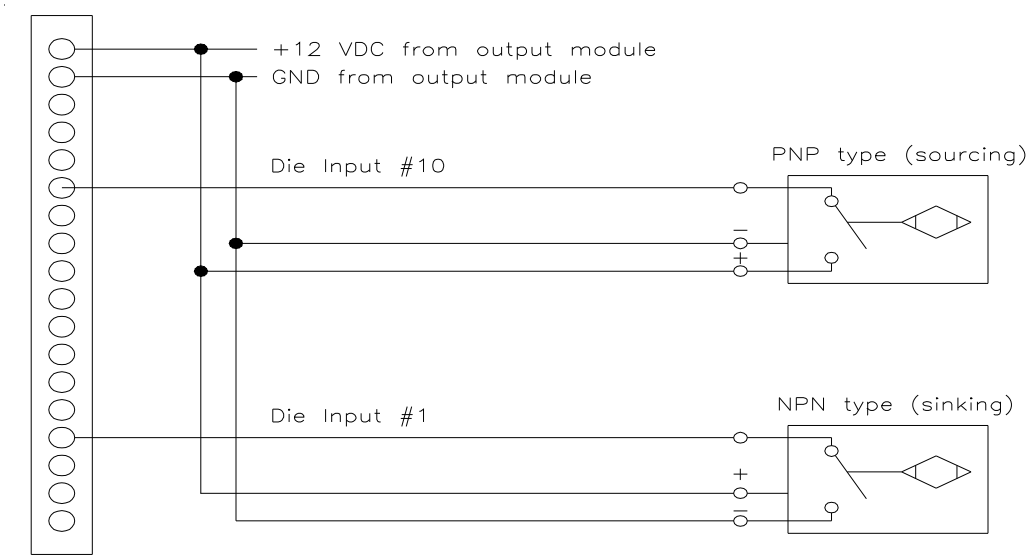


Figure 2-7 Open Collector Devices, Photo Switches, Proximity Switches, ETC.

Chapter 3: Keyboard Layout

This chapter includes descriptions of the controller's programming keys. These keys are used to program functions and perform basic operations. These keys can be found on the controller's faceplate on the data entry and commands keypads, as shown in Figure 3-1.

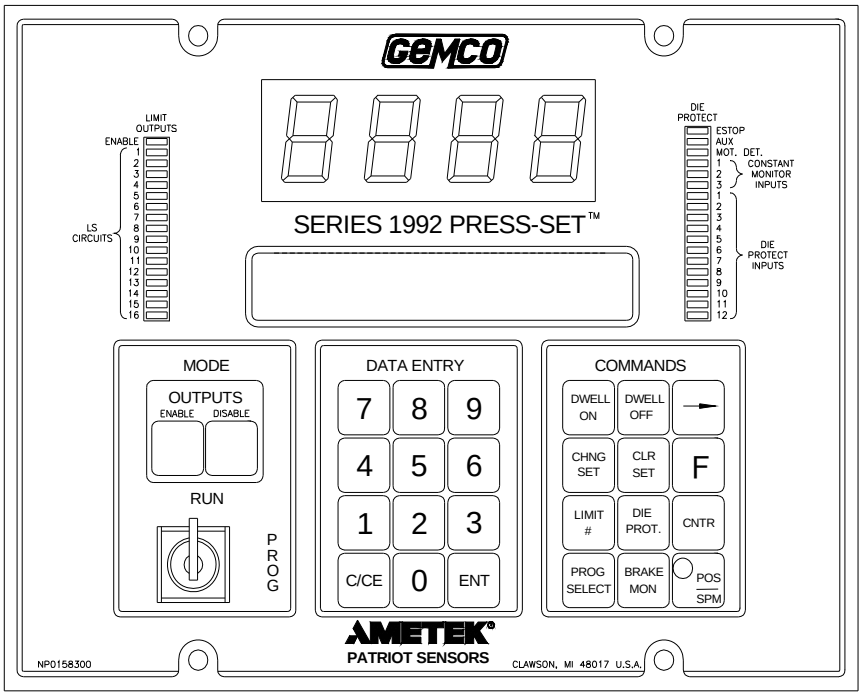


Figure 3-1 Controller's Faceplate

3.1: Keys Defined

The following are descriptions of the data entry and command keys. These descriptions only describe the basic function(s) of each key, and may not provide the necessary instructions for programming a function or performing a basic operation. For instructions on programming a function or performing a basic operation, see Chapters 4-7.

DWELL ON

The Dwell On key is used to program a position or degree where a particular limit switch will become energized. When the Dwell On key is selected, the controller prompts the user to enter the position.

DWELL OFF

The Dwell Off key is used to program a position or degree where a particular limit switch will become de-energized. When the Dwell Off key is selected, the controller prompts the user to enter the position.

The Arrow key is used to scroll through the function list, as well as, move the insertion point to particular choices within a function. Before selecting the arrow key, the function key must be selected first.

CLR SET

The Clear Set key is used to clear a limit switch's previously programmed dwell on or dwell off position.

F

The Function key is used to access a specific function. The user selects this key followed by the function's number, then selects Enter. The Arrow key can also be used to access a function if the function's number is not known.

CNTR

The Counter key is used to select a specific counter. When this key is selected, the controller will prompt the user to choose either a stroke, batch, or total counter for programming.

POS SPM

The Position and Stroke-Per-Minute key is used to display either the current position of the resolver or the resolver's SPMs (Stroke Per Minute) on the controller's LED. When one of the choices is displayed on the LED, the other is displayed on the controller's LCD.

BRAKE MON

The Brake Monitor key is used to program a safe time in which the press should stop. Once programmed, this function will warn the user if the press does not stop within the programmed time.

PROG SELECT

The Program Select key is used to select a particular program the user created. To determine how many programs the Press-Set can store, see Appendix D: Specifications.

DIE PROT.

The Die Protection key is used to access one of the controller's 12 die protection inputs for programming. The user first selects this key followed by the number of the die protection input. After selecting the enter key, the controller prompts the user to program the input.

LIMIT #

The Limit Number key is used to access one of the 16 limit switches for programming. The user first selects this key followed by the number of the desired limit switch. After selecting the enter key, the controller prompts the user to enter either the Dwell On or Dwell Off key.

CHNG SET

The Change Set key is used to change a limit switch's previously programmed dwell on or dwell off position.

ENT

The Enter key is used to implement a selected command key or value entered from the data entry keypad.

C/CE The Clear key is used to clear a selection that was previously made, such as a function or a value entered into a function. This key only clears the *last key* that was entered.

Data Entry Keys The Data Entry keys (0 through 9) allow the user to input values for functions and calibrations.

NOTE: The Controller can only be programmed when its keyswitch is in program mode. Programmed parameters can be viewed when the keyswitch is in run mode, but not altered. A compete list of functions can be found in Appendix B: Function Summary Chart.

Chapter 4: General Calibration

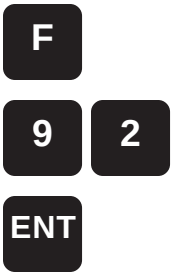
In order to customize the controller to your specific press operation, it is required that you program a series of settings. These settings are referred to as general calibration. Except for minor adjustments, once general calibration has been competed, the controller will not need to be calibrated again. This chapter contains all settings for calibrating your controller. Each setting contains introductory information followed by instructions on how to program the setting. You may find that some of these settings are not necessary or are already defaulted to your particular press operation. In these cases, you will not need to make any adjustments. The following is a list of all the settings in this chapter:

- Initialization
- Selective Lockout
- Scale Factor
- Offset
- Speed Window
- Motion Detect
- Brake Monitor
- Decimal Location
- Displaying Resolver's Position/SPM
- Displaying Remote Display Position

NOTE: The Controller can only be programmed when its keyswitch is in program mode. Programmed parameters can be viewed when the keyswitch is in run mode, but not altered.

4.1: Initialization

Initializing the controller presets all of the controller's calibration settings to factory calibration and deletes any programming that may be on the controller. Due to factory testing, there may be some undesired data programmed into your controller. Because of this, it is recommended that you initialize the controller upon receiving it from the factory. To initialize the controller, perform the following steps:



1. Select the function key followed by function number 92. Select Enter.

   The controller displays "SYSTEM RE-INITIALIZATION ARE YOU SURE? y/N"

→ ENT

2. To select yes, select the arrow key to position the insertion point below the y (yes). Select Enter.

   The controller displays "ALL DATA WILL BE ERASED ARE YOU SURE? y/N"

→ ENT

3. To erase all existing data programmed into the controller, select the arrow key followed by Enter.

   The controller displays "INITIALIZING PLEASE WAIT". The controller will be initialized when the main display appears.

4.2: Selective Lockout

The Selective Lockout feature will allow you to program a passcode into the Press-Set so that, without entering the passcode, certain programmed parameters cannot be changed. This provides additional security when used with the security keyswitch. To program this additional security, you first need to select or lock the parameters you wish to protect. The next step is to choose a four-digit passcode. 0000 is provided as an initial passcode. The final step is then to turn the security keyswitch to run mode. Once these steps are done, the locked parameters cannot be changed without first entering the passcode. The following steps instruct you on how to unlock protected parameters by entering the passcode (steps 1-2), select or lock parameters (steps 3-5), and change the passcode (steps 6-9):

F
5 5
6 ENT

1. To enter the passcode, select the function key followed by function number 556. Select Enter.

   The controller displays "ENTER LOCKOUT PASSCODE>><<<"

Enter 0000

ESC

2. Enter 0000 followed by Enter.

   The controller unlocks the protected parameters and returns to the main display.

NOTE: If the controller displays "INCORRECT PASSWORD ACCESS DENIED" after performing step 2, you entered the incorrect passcode.

F
5 5
5 ENT

3. To select specific parameters you wish to lock, select the function key followed by function number 555. Select Enter.

The controller displays “LIMIT #1 UNLOCKED
LIMIT #2 UNLOCKED”.

This is the beginning of a list of parameters that you can lock. The first two specify parameters for limit switch 1 and 2.

→

4. Select the arrow key to scroll through the list of parameters that can be locked.

ENT
CLR SET

5. Select Enter when your choice is positioned at the top of the display. Select the clear set key to return to the main display.

The parameter(s) you selected will be locked once the security keyswitch is turned to run mode and the main display is shown.

F
5 5
7 ENT

6. To change the 0000 passcode, select the function key followed by function number 557. Select the enter key.

The controller displays “ENTER CURRENT PASSWORD>> <<“.

Enter 0000
ENT

7. Enter 0000 followed by Enter.

The controller displays “ENTER NEW PASSWORD >> <<“.

Enter a four-digit number
ENT

8. Enter a four-digit number followed by Enter.

The controller displays “ENTER AGAIN TO VERIFY>> <<“.

Enter a four-digit number again
ENT

9. Enter the four-digit number again followed by Enter

The controller returns to the main display. Once the security keyswitch is turned to the run mode and the main display as shown, parameters selected in steps 3-5 will be locked until the new passcode is entered.

4.3: Scale Factor

Scale Factor is the number of increments or the resolution that the resolver is based on. For example, a resolver based on a 360° scale factor will have to travel from 0° to 359° to produce a complete stroke. Scale factors above 360° will affect the speed accuracy of the system. For example, a scale of 3600° will only give one count accuracy at 100 SPM, whereas 360° will give one count accuracy at 1000 SPM. The Press-Set is defaulted to a 360° scale factor. If you wish to change this, perform the following steps:

NOTE: Changing the scale factor will delete all data previously programmed into the controller.

F
7 2
ENT

1. Select the function key followed by function number 72. Select Enter.

   The controller displays "SCALE FACTOR: 360 CHANGE?>>y/N".

→
ENT

2. Select the arrow key followed by Enter.

   The controller displays "CHANGE WILL DELETE ALL DATA. CHANGE? y/N".

→
ENT

3. Select the arrow key followed by Enter. This will delete all pro grammed data.

   The controller displays "SCALE FACTOR>>360".

Enter new scale factor
ENT

4. Enter the new scale factor. Select Enter.

   The controller displays "CHANGING SCALE FACTOR". The controller will be programmed to the new scale factor when the main display appears.

4.4: Offset

The Offset function is used to synchronize the controller's position so that the controller corresponds to the position of the ram. Normally, when the controller displays zero for the resolver's position, the press's ram is physically positioned at the top of the stroke. Before you program the offset, it is recommended that you properly position the ram. To program the controller's offset, perform the following steps:

F
7 9
ENT

1. Select the function key followed by function number 79. Select Enter.

   The controller displays "ENTER OFFSET VALUE>>x".

Enter ram's position
ENT

2. Enter the degree that will correspond to the ram's position on the press. Select Enter.

   The controller displays "OFFSET EXECUTED" and returns to the main display.

4.5: Speed Window

The Speed Window function is used to warn the operator if the press's SPM has increased or decreased beyond a programmed range. This range is programmed into the speed window function. If the press's speed goes above or below the programmed ranges, the controller's E-STOP relay will de-energize. As a result, if this relay is wired properly to the press, the press will E-STOP. Because it takes time for the press to pick up speed when it starts, the controller will not begin to monitor the press's speed until three strokes are performed. Also, when the press's brake is applied this function is disabled. To program the controller's speed window, perform the following steps:

F
7 4
ENT

1. Select the function key followed by function number 74. Select Enter.

   The controller displays "ENABLE/DISABLE SPEED WINDOW>>DISABLE".

→
ENT

2. To select ENABLE, select the arrow key. Select Enter.

   The controller displays "WINDOW MIN: x MAX: x".

Enter minimum value

ENT

3. Enter the minimum value. This value will instruct the press on how slow it can go during machine operation. Select Enter.

Enter maximum value

ENT

4. Enter the maximum value. This value will instruct the press on how fast it can go during machine operation. Select Enter.

ESC

5. To program these values, select Enter.

   The controller displays "WINDOW IS ENABLED MIN: x MAX:x".

4.6: Motion Detect

The Motion Detect function is used to detect a decrease in press speed due possibly to a broken chain. The minimum speed at which the press should run at is programmed into the motion detect function. If the press runs below the programmed value, the motion detect relay will de-energize. As a result, if this relay is wired properly to the press, the press will E-STOP. To program the controller's motion detect function, perform the following steps:

F

8 3

ENT

1. Select the function key followed by function number 83. Select Enter.

   The controller displays "MOTION DETECT VALUE SPM>>x".

Enter motion detect value

ENT

2. Enter your motion detect value. Select Enter.

   The controller displays "MOTION DETECT VALUE IS x". The controller will be programmed to the new motion detect value when the main display appears.

4.7: Brake Monitor

The Brake Monitor function is used to warn the operator when the press is not stopping within the programmed safe stopping time. The brake monitor receives 120 VAC from the press's brake clutch solenoid valve. When the monitor senses a loss in voltage from the brake clutch solenoid valve, a timer within the controller is activated. This timer stops when the brake monitor senses no movement (the press's ram is no longer moving). If the internal timer has a greater time than the programmed time, a brake monitor fault will occur. This could be due to brake wear. Each time the brake is applied, the Press-Set starts a timer and compares it with the value programmed in the brake monitor function. To program this function, perform the following steps:

BRAKE MON

1. Select the brake monitor key.

   The controller will display "SD: x ST: x.xxxs ACCEPTABLE ST: xxxms".

Enter stop time in milliseconds

ENT

2. Enter your stop time in milliseconds: Select Enter.

   The controller displays "ACCEPTABLE STOP TIME: xms".

4.8: Decimal Location

The Decimal Location function is used to program the resolution of the resolver's position displayed on the controller's LED. Resolution can be either displayed in whole units, tenths, hundredths, or thousandths. The controller is defaulted to display the resolver's position in whole units. To change the resolution of the resolver's position displayed on the controller's LED, perform the following steps:

F

5 0

ENT

1. Select the function key followed by function number 50. Select Enter.

   The controller displays "DECIMAL POINT SET 0000. HIT - > TO CHANGE".

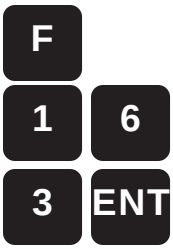
Select resolution

ENT

2. To change the resolution to thousandths, select the arrow key followed by Enter. To change the resolution to hundredths, select the arrow key twice followed by Enter. To change the resolution to tenths, select the arrow key three times followed by Enter.

4.9: Displaying Resolver's Position and SPM

You can view both the resolver's position and SPM on the controller's LED and LCD displays. The controller is defaulted to show the position on its LED display and the SPM on its LCD display. To reverse the position of these readings, perform the following steps:



1. Select the function key followed by function number 163. Select Enter.

   The controller displays "POWER-UP DISPLAY POS/SPM >> POS".

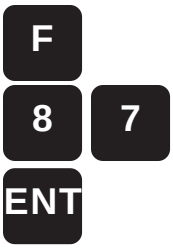
2. Select the arrow key followed by Enter.

   The controller displays "SPM WILL BE DISPLAYED ON POWER UP".

   On the next power up, the controller will show the SPM on the LED display and the position on the LCD display.

4.10: Displaying Remote Display Position

To display rotary position on Gemco's Remote Display, you must configure the Press-Set to do so. To do this, perform the following steps:



1. Select the function key followed by function number 87. Select Enter.

   The controller displays "SERIAL COMMUNICATION IS SET AT >> 4-WIRE".

2. Select the arrow key followed by Enter.

   The controller displays "COMM. TO THE ROTOCRANK DISPLAY IS >> DISABLE".

3. Select the arrow key followed by Enter.

   The controller displays "SERIAL PORT: 2-WIRE ROTOCRANK ENABLE" and returns to the main display.

   The controller is now configured to display rotary position on the Remote Display. (For instructions on wiring the Remote Display, see 2.2: Wiring).

Chapter 5: Multiple Programs

The Press-Set is designed to hold up to 200 different programs in its memory at one time. This allows you to program different limit switch dwell on and dwell off positions, as well as other programmed settings, for each program. A program's particular data can be accessed at any given time. This is possible by assigning a unique number to each program. Program numbers can be one to nine digits in length. It is recommended that you first assign a number to a program before programming dwell on and dwell off positions and other settings. Otherwise, the settings will be saved in program #1 (or the program the controller is currently in). This is because the controller contains one program assigned as #1 when it leaves the factory. This chapter contains instructions for the following tasks:

- Assigning a New Program Number
- Changing a Program's Current Number
- Accessing a Program
- Copying a Program
- Clearing a Program
- Clearing all Programs

NOTE: The Controller can only be programmed when its keyswitch is in program mode. Programmed parameters can be viewed when the keyswitch is in run mode, but not altered.

5.1: Assigning a New Program Number

Before programming a dwell on and dwell off positions for limit switches, it is recommended that you first assign a number to the program. By assigning a new number, a new program is created. To assign a new program number, perform the following steps:

PROG SELECT

1. Select the Program Select button.

   The controller displays "CURRENT PROG: x ENT NEW PROG>> x".

Enter new program number

ENT

2. Enter new program number. Select Enter.

   The controller displays "COUNTER BALANCE IS NOW SET TO 255 PSI" followed by "PROGRAM #x NO SETPOINTS PROGRAMMED" and returns to the main display.

NOTE: Counterbalance pressure is defaulted to 255 psi, if a minimum and maximum pressure was not previously set in function number 141. If these settings were made previously, the programmed minimum pressure will be defaulted to the new program. For more information on setting a counterbalance pressure for a specific program, see Chapter 9: Optional D25 Port.

5.2: Changing a Program's Current Number

Program numbers assigned to programs saved in the controller can be changed at anytime. Before changing a program's current number, the program must first be accessed. To change a program's current number, perform the following steps:

F

9 0

ENT

1. Select the function key followed by function number 90. Select Enter.

   The controller displays "RENAME PROG # : x TO PROGRAM #: x".

Enter new program number

ENT

2. Enter a new program number. Select Enter.

   The controller displays "THE NEW PROGRAM NUMBER IS x" and returns to the main display.

NOTE: After changing a program's number, its previous number will no longer exist. You can confirm this by selecting the program select key and scrolling through the program scroll list by using the arrow key. The number should not appear in the program scroll list.

5.3: Accessing a Program

A specific program can be accessed from the controller's memory at anytime. To access a program, perform the following steps:

PROG SELECT

1. Select the Program Select key.

   The controller displays "CURRENT PROG: x ENT NEW PROG>> x".

Enter new program number

ENT

2. Enter the program number. You can either enter the program number by using the data entry keypad or by scrolling through the list of stored programs (program scroll list) by using the arrow key. Select Enter.

   The controller displays "COUNTER BALANCE IS NOW SET TO x PSI" and returns to the main display.

5.4: Copying a Program

You can copy data from one program to another. This saves you time from having to reprogram similar data, such as limit switch settings, that were already created in a previous program. Before copying a program, the program that contains the data that you wish to copy from must first be accessed. To copy a program's data to another program, perform the following steps:

F

9 3

ENT

1. Select the function key followed by function number 93. Select Enter.

   The controller displays "COPY PROG #: x TO PROGRAM #: x".

Enter program number

ENT

2. Enter the program number you wish to copy data to from the program currently accessed. Select Enter.

   The controller displays either "PROGRAM COPIED TO: x" or "PROGRAM USED REPROGRAM? y/N". If you get the second message, selecting "y" (yes) will overwrite the program's existing setpoints. To do this, continue to the next step.

See step 2's note

→

ENT

3. Select the arrow key followed by Enter.

   The controller displays "PROG USED REPROGRAM? Y/n ARE YOU SURE? y/N".

→

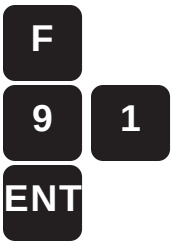
ENT

4. Select the arrow key followed by Enter.

   The controller displays "PROGRAM COPIED TO #x" and returns to the main display. The program that had data copied to it will now be the active program.

5.5: Clearing a Program

You can clear a program and its data at anytime. After clearing a program, its program number will still appear in the program scroll list. To clear a program, perform the following steps:



1. Select the function key followed by function number 91. Select Enter.

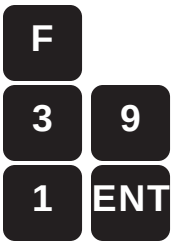
   The controller displays "CLEAR PROG #x ARE YOU SURE? y/N".

2. Select the arrow key followed by Enter.

   The controller displays "PROGRAM x CLEARED" and returns to the main display.

5.6: Clearing All Programs

You can clear all programs and their data saved in the controller at anytime. After clearing all programs, their program numbers will not appear in the program scroll list. Clearing all programs will not erase any calibration settings, such as the offset or motion detect, that were previously made. To clear all programs, perform the following steps:



1. Select the function key followed by function number 391. Select Enter.

   The controller displays "CLEAR ALL PROGRAMS? y/N".

2. Select the arrow key followed by Enter.

   The controller displays "CLEAR ALL PROGRAMS? Y/n ARE YOU SURE? y/N".

3. Select the arrow key followed by Enter.

   The controller displays "ALL PROGRAMS CLEARED FROM MEMORY" and returns to the main display.

Chapter 6: Limit Switches

There are 16 Limit Switches installed on the output module. When wired properly, these limit switches can control devices that work with the press. Such devices can include lubricators, press feed limits (feed and pilot), air blow-offs, transfer equipment, etc. A limit switch can be programmed in two states: **dwell on** and **dwell off**. A limit switch is energized between its dwell on and dwell off positions.

6.1: Programming Based on the Resolver's Scale Factor

Programming a limit switch is based on the resolver's scale factor. For example, assume a Press-Set is calibrated at a 360° scale factor. If you programmed limit switch 1 to energize at 180° and de-energize at 270°, limit switch 1 would energize as shown in Figure 6-1. The shaded area represents the area of the press stroke where the limit switch is energized.

Figure 6-1 Programmed Limit Switch Based on a 360° Scale Factor

6.2: Multiple Dwells

The user has the ability to program multiple dwell (dwell on and dwell off positions) on the Press-Set. As a result, a limit switch can become energized and de-energized more than once in one rotation of the resolver. Figure 6-2 illustrates a limit switch becoming energized from 20-80°, 100-180°, and 200-270°.

Figure 6-2 Multiple Dwells

6.3: Limit Switches Having Only a Dwell On or Dwell Off

A Limit Switch also can be programmed with *only* a dwell on or dwell off position. When programmed with only a dwell on position, the limit switch energizes when its dwell on position is reached and de-energizes when 0° is reached. On the other hand, when programmed with only a dwell off position, the limit switch energizes at 0° and de-energizes when the dwell off position is reached. Both of these examples are illustrated in Figure 6-3.

Figure 6-3 Limit Switches with Only a Dwell On or a Dwell Off Position

6.4: Programming a Limit Switch

To program a Limit Switch with a dwell on and a dwell off position, perform the following steps:

LIMIT #

1. Select the limit number key.

   The controller displays "ENTER LIMIT #>>".

Enter limit switch number

ENT

2. Enter a number from 1-16. This number will correspond with one of the 16 limit switches found on the output module. Select Enter.

   The controller displays "LIMIT #x PRESS DWELL ON OR DWELL OFF KEY".

DWELL ON

3. Select the dwell on key.

   The controller displays "DWELL ON LIMIT # x NONE".

Enter dwell on position

ENT

4. Enter a value within your resolver's scale factor. The value entered will be the point at which the limit switch will become activated. Select Enter. (See Chapter 4: General Calibrations, if you have not yet programmed a scale factor).

   The controller displays "DWELL ON LIMIT# x x".

DWELL OFF

5. Select the dwell off key.

   The controller displays "DWELL OFF LIMIT# x NONE".

Enter dwell off position

ENT

6. Enter a value within you resolver's scale factor. The value entered will be the position on the resolver where the limit switch will become de-energized. Select Enter.

   The controller displays "DWELL OFF LIMIT# x x".

C/CE

7. Repeat steps 1-6 if you wish to program other limit switches. When all limit switches have been programmed, select the clear key to return to the main display.

NOTE: To program a limit switch with multiple dwells, simply enter the same number while performing steps 1-6; or you can press the dwell on/off keys again while programming that limit switch.

6.5: Clearing a Limit Switch

To clear a specific limit switch's dwell on and dwell off position, perform the following steps:

LIMIT #

1. Select the limit number key.

   The controller displays "ENTER LIMIT #>>".

Enter limit switch number

ENT

2. Enter the number of the limit switch you wish to clear. Select Enter.

   The controller displays "LIMIT # x PRESS DWELL ON OR DWELL OFF KEY".

DWELL ON

3. If the limit switch has a programmed dwell on position you wish to clear, select the dwell on key.

   The controller displays "DWELL ON LIMIT# x x".

CLR SET

4. To clear the limit switch's dwell on position, select the clear set key.

   The controller displays "CLEAR SETPOINT: x ARE YOU SURE? Y/n".

NOTE: If there is more than one dwell on position that you wish to delete, one at a time, select each position using the arrow key followed by Enter and the clear set key. Repeat this until all desired positions have been cleared.

ENT

5. Select Enter.

   The limit switch's dwell on position had been cleared.

DWELL OFF

6. If the limit switch has a programmed dwell off position you wish to clear, select the dwell off key.

   The controller displays "DWELL OFF LIMIT # x x".

CLR SET

7. To clear the limit switch's dwell off position, select the clear set key.

   The controller displays "CLEAR SETPOINT: x ARE YOU SURE? Y/n".

NOTE: If there is more than one dwell off position that you wish to delete, one at a time, select each position using the arrow key followed by Enter and the clear set key. Repeat this until all desired positions have been cleared.

ENT

8. Select Enter.

The limit switch's dwell off position has been cleared.

C/CE

9. To return to the main display, select the clear set key.

6.6: Changing a Limit Switch's Dwells

To change a dwell on and dwell off position for a particular limit switch, perform the following steps:

LIMIT #

1. Select the limit number key.

The controller displays "ENTER LIMIT # >>".

Enter limit switch number

2. Enter the number of the limit switch you wish to change. Select Enter.

ENT

The controller displays "LIMIT # x PRESS DWELL ON OR DWELL OFF KEY".

DWELL ON

3. If the limit switch has a programmed dwell on position(s) you wish to change, select the dwell on key.

The controller displays "DWELL ON LIMIT # x x".

→

4. If the limit switch contains more than one programmed dwell on position, select the arrow key to position the insertion point below the dwell on position you wish to change.

CHNG SET

5. Select the change set (CHNG SET) key followed by Enter.

ENT

The controller displays "OLD SETPOINT: x ENTER NEW SETPT. >> x".

Enter new dwell on position

6. Enter the new dwell on position or setpoint for the limit switch. Select Enter.

ENT

The controller displays the new dwell on position.

NOTE: If you enter a new dwell on value that is the same as the limit switch's dwell off position, the controller will display "DWELL ALREADY PROGRAMMED AS A DWELL OFF".

C/CE

7. To change a dwell off position, repeat steps and select the dwell off key in step 3. When competed, select the clear (C/CE) key to return to the main display.

6.7: Speed Compensation

Speed Compensation is used to program limit switches to energize earlier than their programmed dwell on position. As the press's speed increases, limit switches programmed with speed compensation will energize earlier. This function can be used with some devices which mechanically lag behind as the press speed increases, or used in series with the mechanical cam for top stop.

Figure 6-4 illustrates a limit switch programmed with five linear offsets. The first offset prevents the limit switch from energizing no earlier than its dwell on position while the resolver is at or under 50 SPM. When the resolver reaches 100 SPM, the limit switch energizes 20 counts earlier than its dwell on position. This is according to the second linear offset. If the resolver is moving between 50-100 SPM, the rate of advance is applied linearly.

Figure 6-4 Linear Chart Showing SPM and Linear Offset Settings.

NOTE: If a fifth offset was not used in the above example, the linear speed ramp would continue at the same angle as the previous offset, as shown in Figure 6-4 represented in a dashed line.

6.8: Selecting a Limit Switch for Speed Compensation

Before programming speed compensation settings, you must first select the limit switch(es) you wish to assign speed compensation settings to. The purpose for selecting specific limit switches for speed compensation is because not all devices connected to the 16 limit switches may need speed compensation. In fact, it may be harmful to add speed compensation to limit switches that are wired to certain devices. To select the limit switch(es) for speed compensation, perform the following steps:

F
8 0
ENT

1. Select the function key followed by function number 80. Select Enter.

   The controller displays “SELECT LIMIT >> NONE”.

Enter limit switch number
ENT

2. Enter the number of the limit switch you wish to program speed compensation to. Select Enter.

   The controller displays the number you had entered.

NOTE: To cancel the assignment of speed compensation to a limit switch, enter the number of the limit switch while performing step 2 again.

C/CE

3. If you wish to select more limit switches, repeat step 2. Otherwise, select the clear key to return to the main display before proceeding to Programming Speed Compensation.

6.9: Programming Speed Compensation

The Press-Set has the ability to store up to 16 different speed compensation settings. Before programming speed compensation settings, you must first select the limit switch(es) you wish to program speed compensation settings to. If you haven’t already done this, perform the instructions found under Selecting a Limit Switch for Speed Compensation. To program speed compensation settings for a limit switch(es), perform the following steps:

F
8 1
ENT

4. Select the function key followed by function number 81. Select Enter.

   The controller displays “PROGRAM SPEED OFFSETS # OF STEPS (1-16)>> x”.

Enter number from 1-16
ENT

5. Enter a number from 1-16. This number corresponds to the number of steps desired. Select Enter.

   The controller displays “STEP x OFFSET >> NONE SPM >> NONE”.

NOTE: To subtract a step(s) from a limit switch, enter the number of desired steps (less than the currently programmed number) in step 5.

Enter offset value

ENT

6. Enter the offset value followed by Enter. The offset value is the number of counts sooner that the controller will energize the limit switch before its programmed dwell on position. For example, if the limit switch has a dwell on position of 180° (based on a 360° scale factor), and you program this limit switch to have an offset value of 10 counts, the controller will energize the limit switch at 170° when the press's speed increases to a programmed SPM value. (The SPM value is entered in the next step.)

Enter SPM value

ENT

7. Enter the SPM value followed by Enter. This is the rate at which the controller will automatically adjust the offset value linearly when the press operates between 0 SPM and the SPM value entered in this step. When the press operates above the SPM value entered in this step, the controller will energize the limit switch at the rate of advance entered in step 6.

C/CE C/CE

8. Select the clear key twice to return to the main display.

6.10: Speed Offset Latch

The Speed Offset Latch function should be considered when a die protection input(s) is linked to the E-STOP relay and a limit switch(es) is programmed with speed compensation. If a fault occurs during machine operation which de-energizes the E-STOP, and this occurs at the moment when a limit switch has been energizes earlier than its programmed dwell on position (limit switch is programmed with speed compensation), the limit switch will re-energize in the same stroke when the fault is cleared and the press is started back up. The speed offset latch function compensates for this by forcing the limit switch to continue to energize where the press stopped, and will not re-energize at the limit switch's programmed position in the current stroke. This is accomplished by enabling the speed offset latch function. In some cases, it may not be necessary to enable this function. However, in the case where the limit switch actuates a metal feeder, enabling this function may be necessary in order to avoid metal from being fed twice into the press which could cause a jam. As a default, this function is disabled. To enable the speed offset latch function, perform the following steps:

F
9 5
ENT

1. Select the function key followed by function number 95. Select Enter.

   The controller displays “SPEED OFFSET LATCH >> ENABLED”.

→
ENT

2. Select the arrow key followed by Enter.

   The controller displays “SPEED OFFSET LTCH IS DISABLED” and returns to the main display.

6.11: Bypassing Speed Compensation While in Inch Mode

When operating in Inch Mode, it may be necessary to bypass programmed speed compensation settings. To bypass speed compensation, die protection input #10 must be put in inch mode. As a default, this input is in normal mode. When using the inch bypass function (94), the inch selector switch must be connected to die protection input #10. See Figure 6-5. This must be a dry contact. To put the input in inch mode, perform the following steps:

F
9 4
ENT

1. Select the function key followed by function number 94. Select Enter.

   The controller displays “DIE INPUT #10 IS >> NORMAL”.

→
ENT

2. Select the arrow key followed by Enter.

   The controller displays “DIE INPUT 10 IS SET TO INCH MODE” and returns to the main display.

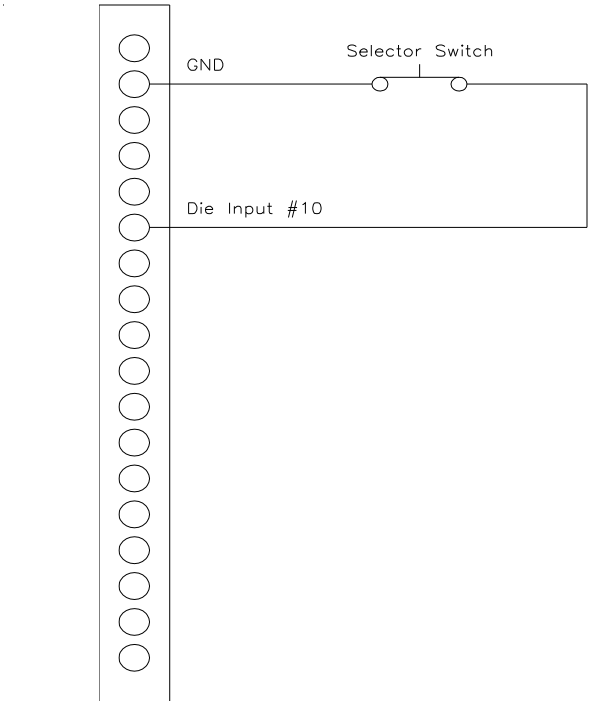


Figure 6-5 Connecting Input #10 to Push Button

6.12: Time-Dwell Limit Switches

Time-dwell Limit Switches are limit switches programmed to energize at a position and stay on for a specific *time* before de-energizing. This is opposite of programming a limit switch to de-energize at a specific position (dwell off) in the resolver's scale factor. Specific devices that could benefit from this type of programming could be lubricators and air blow-offs. These types of devices only need to be energized for a specific amount of time. If these devices were dependent on a dwell off position, they could cause waste by staying energized if the press were to stop in the limit switch's dwell area. To program a time-dwell limit switch(es), perform the following steps:

F
3 0
0 ENT

1. Select the function key followed by function number 300. Select Enter.

   The controller displays "POS/TIMED-OFF LIMIT ENTER LIMIT #>>".

Enter limit switch number

ENT

2. Enter the number of the limit switch(es) you wish to program as a time-dwell limit switch. Select Enter.

   The controller displays "LIMIT # x POS/TIME >> POS".

→

ENT

3. Select the arrow key to change the current selection from POS (position) to TIME. Select Enter.

   The controller displays "LIMIT #x TIMED-DWELL ENTER TIME >> NONE".

NOTE: The controller may display "ALL DWELLS MUST BE DELETED FOR THIS LIMIT" and prompt you to delete dwells for the limit switch you have chosen. The controller will not allow you to create a time-dwell limit switch that currently has either a programmed dwell on or dwell off position. You must delete the limit switch's dwells before proceeding.

Enter the time value

ENT

ENT

4. Using the controller's data entry keypad, enter the time you wish the limit switch to stay energized. You can choose from .01 - 9.99 seconds. Select Enter twice.

ENT

5. If you wish to program more time-dwell limit switches, repeat steps 2-4. Otherwise, select Enter to return to the main display.

LIMIT #

6. To program the position at which the time-dwell limit switch will energize, select the limit number key.

   The controller displays "ENTER LIMIT #>>".

Enter the limit switch number

ENT

7. Enter the same limit switch you had chosen in step 2. Select Enter.

   The controller displays "LIMIT #x PRESS DWELL ON OR DWELL OFF KEY".

DWELL ON

8. Select the dwell on key.

   The controller displays "DWELL ON LIMIT # x NONE".

Enter dwell on position

ENT

C/CE

9. Enter the position at which you want the time-dwell limit switch to energize. Select Enter.

   The controller displays the position you entered. You have now programmed a time-dwell limit switch. To return to the main display, select the clear key.

6.13: Changing Limit Switch's Time-Dwell Value

To change a limit switch's time-dwell value, perform the following steps:

LIMIT #

1. Select the limit number key.

   The controller displays "ENTER LIMIT #>>".

Enter the limit switch number

ENT

2. Enter the limit switch number followed by Enter.

   The controller displays "LIMIT #x PRESS-DWELL ON OR DWELL OFF KEY".

DWELL OFF

3. Select the dwell off key.

   The controller displays "LIMIT #x TIMED-DWELL ENTER TIME >>x.xx".

Enter new value

ENT

4. Enter the new time-dwell value. Select Enter.

   The controller displays the new time-dwell value.

ENT

5. Select Enter to return to the main display.

6.14: Clearing Time-Dwell Limit Switches

To clear a time-dwell limit switch, perform the following steps:

F

3 0

0 ENT

1. Select the function key followed by function number 300. Select Enter.

   The controller displays "POS/TIMED-OFF LIMIT ENTER LIMIT # >>".

Enter limit switch number

ENT

2. Enter the number of the limit switch you wish to clear. Select Enter.

   The controller displays "LIMIT #x POS/TIME >> TIME".

ENT

3. Select Enter.

The controller displays “LIMIT #x TIMED-DWELL ENTER TIME >> x.xx”.

0

ENT

4. Select 0 followed by Enter.

The controller displays “LIMIT #x TIMED-DWELL ENTER TIME >> NONE”.

C/CE

5. Select the clear (C/CE) key.

The controller displays “POS/TIMED-OFF LIMIT ENTER LIMIT # >>”.

LIMIT #

6. To clear the position at which the limit switch energizes, select the limit number key.

The controller displays “ENTER LIMIT #>>”.

Enter the limit switch number

ENT

7. Enter the number of the limit switch. Select Enter.

The controller displays “LIMIT #x PRESS DWELL ON OR DWELL OFF KEY”.

DWELL ON

8. Select the dwell on key.

The controller displays “DWELL ON LIMIT # x x”.

CLR SET

9. Select the clear set key.

The controller displays “CLEAR SETPOINT: x ARE YOU SURE Y/n”.

ENT

10. Select Enter.

The controller displays “DWELL ON LIMIT # x NONE”.

C/CE

11. The limit switch’s position has been cleared. To return to the main display, select the clear key.

NOTE: Although the time-based value was cleared in step 4, the limit switch is still set up in the time-based mode. You will need to change this limit switch back to position mode if you decide to program a dwell off position for it in the future.

6.15: Periodic Control Actuation (PCA) Limits

Unlike a normally programmed limit switch, which will energize each time the press performs a stroke, a limit switch programmed with Periodic Control Actuation (PCA) will energize only after the press performs a programmed number of strokes. This is beneficial for some devices that do not need to be energized for each stroke, like a lubricator. Because PCA limit switches energize according to a programmed number of strokes, these limit switches work in conjunction with the controller's stroke counter. Up to four limit switches can be programmed with PCA.

6.16: Programming Limit Switches with PCA

To program a limit switch with periodic actuation, perform the following steps:

F
6 0
ENT

1. Select the function key followed by function number 60. Select Enter.

   The controller displays "ENTER PCA LIMIT >> NONE".

Enter limit switch number
ENT
C/CE

2. Enter the limit switch you wish to energize periodically. Select Enter.

   The controller prompts you to enter another limit switch. Repeat step 2 if you wish to enter another limit switch. To return to the main display, select the clear key.

NOTE: To clear a limit switch, select the number of the limit switch you wish to clear while performing step 2. Select Enter.

6.17: Programming a Value to the PCA Limit Switch

F
6 1
ENT

3. Select the function key followed by function number 61. Select Enter.

   The controller displays "LIMIT #x PCA VALUE >> 1".

Select number of strokes

4. Select the value of strokes to occur on the press before the limit switch energizes. This value must be between 1-32,767. The default value is 1. Select Enter.

ENT

C/CE

5. The controller prompts you to enter another value if more than one limit switch was set up using function number 60. If you wish to, repeat step 4. To return to the main display, select the clear key.

NOTE: To clear a value for a limit switch, enter 1 in step 4. Further, in order for PCA limit switches to eventually energize, they must be programmed with dwell on and dwell off positions.

6.18: Force Mode (Forcing an Output On or Off)

This mode allows the user to enter a special mode of operation in which the outputs can be forced on or off regardless of the resolver's position and the limit settings. To enter "force mode", function 94 must be set to FORCE (this is a new option for F94). When F94 is set to force mode die input #10 is used to enable force mode. If die input #10 is asserted high or low, "force mode" can be entered by keying in the new function, F400. If the user attempts to enter F400 without setting F94 = FORCE, or without asserting die input #10, an error message will appear. Once in F400, the user can use the arrow key to select an output. Pressing the ENTER key advances the prompt to the force state field where the arrow key is used to select force ON, force OFF, or NONE (no force). Pressing the ENTER key will activate the selected force state and move the prompt back to the output select field. A third field indicates the actual state of the output. De-asserting die input #10 will display an error message for 2 seconds and then de-activate force mode. Pressing C/CE while in force mode will immediately de-activate force mode. When leaving force mode, all outputs return to their normal non-forced state. Force mode settings are not retained after leaving force mode. All outputs will default to NONE each time force mode is entered.

NOTE: Outputs must be enabled for force mode to operate properly.

NOTE: Limit Output bar LED display indicates what state the output would be in if unit were not in force mode. The status of forced output is indicated on the LCD display but not the LED bar display.

Chapter 7: Die Protection Inputs

Die Protection Inputs are used to protect dies from damage due to mis-sequence or buildup of material. This is accomplished by comparing inputs from sensors mounted on or near the dies to dwells programmed into the controller. If the sensors do not change states within the programmed dwell area, a fault can occur depending on how the inputs are programmed. Another type of die protection input available on the Press-Set is a constant monitor input. This input continually checks for a change in state during machine operation. If at any point in the stroke the input changes state, a fault will occur. In all, the Press-Set has 12 programmable die protection inputs and three constant monitor inputs (two normally closed [N.C.] and one normally opened [N.O.]). They are found on the side of the controller. See Figure 1-2 for the location of these inputs.

Programming a die protection input is like programming a limit switch, it needs a dwell on position and a dwell off position. Within this window, a sensing device is used to determine if a process has occurred during a stroke. For example, after the press has formed a part, the part has to be expelled from the die before a new stroke occurs. This is typically accomplished through an air blow off valve, which blows the part out of the die area. If the part is not ejected (due to material buildup or some other fault in the process) a sensor such as a photo switch, whisker sensor, or light curtain would not detect the ejection. As a result, a fault would occur which could stop the press.

The constant monitor inputs are used to monitor functions such as a buckle in metal being fed into the press, or when the material runs out. For example, you could connect a whisker sensor to one of the constant monitor inputs. This sensor could then be used to monitor for any buckles in the metal being fed into the press. Then, if a buckle is detected during machine operations, the press would stop, preventing the buckle from damaging the die.

NOTE: Programmed die protection inputs can only work if sensing devices are connected to the inputs, and if the press is properly wired to either the E-STOP or auxiliary relay found on the output module.

7.1: Applications for Die Protection Inputs

The 12 die protection inputs can operate in three modes, depending on the application. This is opposite for the three constant monitor inputs which monitor only in one mode. This section describes how the 12 die protection inputs can be programmed in the following three modes.

- Momentary
- Partial Revolution Constant Monitor
- Maintain

Momentary

A die protection input programmed in momentary mode only needs to sense something once while the resolver is in the input's programmed dwell window. For example, a N.O. light curtain could be used to detect a part being ejected from a press. When the part is ejected between a programmed dwell window, the light curtain's N.O. circuit would close. If a part is not detected within the programmed dwell window, the output module's E-STOP or auxiliary relay (if wired properly) would top stop or E-STOP the press, respectively (see Figure 7-1). To make this possible, the sensor needs to be connected to one of the 12 die protection inputs. This input would then need to be programmed with a dwell on and dwell off position.

Figure 7-1 Light Curtain Detecting and Ejected Part

Partial Revolution Constant Monitor

An input programmed in partial revolution constant monitor mode operates like a constant monitor input. However, instead of monitoring continuously throughout the press's full stroke, an input programmed in partial revolution constant monitor mode continuously monitors only during part of the revolution (the dwell window the user programs), as shown in Figure 7-2.

Figure 7-2 Buckle, Metal bounces when hit

Maintain

An input programmed in maintain mode can be used to detect short feed of material into the press. After material is fed into the press, a device usually is used to clamp onto the material. This prevents the material from moving before the die is engaged. A sensor programmed with the maintain mode is able to sense this type of fault. It will monitor the material until the end of the revolution it was programmed to monitor, as shown in Figure 7-3.

Figure 7-3 Proximity Switch Monitoring for Short Feeds

7.2: Programming Die Protection Inputs

To program a die protection input, perform the following steps:

DIE PROT.

1. Select the die protection key.

   The controller displays "ENTER DIE PROTECTION NUMBER >>". The controller is asking which die protection input your sensor is connected to. (See Section 2.3: Wiring Schematics for Die Protection Inputs if you have not already connected a sensor to one of the 12 die protection inputs.)

Select die input number

ENT

2. Select the number of the die input that corresponds with the input that your sensor is connected to. Select Enter.

   The controller displays "DIE #x LAST HIT: NONE ON: NONE OFF: NONE".

Select beginning stroke position

ENT

3. Select the position of the stroke in which the sensor should begin to sense. Select Enter.

Select ending stroke position

ENT ENT

4. Select the position of the stroke in which the sensor should stop sensing. Select Enter twice.

   The controller displays “DIE #x OPERATION N.O./N.C. >> N.O.”.

Follow Step 5

5. If the sensor is normally open, select Enter. If the sensor is normally closed, select the arrow key to choose N.C., and then select Enter.

   The controller displays “DIE #x RELAY ESTOP/AUX >> ESTOP”. The controller is asking which relay you wish to have become de-energized if a fault occurs.

Follow Step 6

6. If you want to choose the E-STOP relay, select Enter. If you want to choose the auxiliary relay, select the arrow key to choose AUX, and then select Enter.

   The controller displays “DIE #x ACTIVE DURATION >> MOMENTARY”.

Follow Step 7

7. If you want the sensor to operate in the momentary mode, select Enter. If you want the sensor to operate either in the maintain mode or partial revolution constant monitor mode, select the arrow key to choose either one, and then select Enter. (For more information on what the momentary, maintain, and partial revolution constant monitor modes are and how they work, see 7.1: Applications for Die Protection Inputs).

   The controller displays “ENTER DIE PROTECTION NUMBER >>”.

ENT

8. If you want to program another die protection input, repeat steps 2-7. To return to the main display, select Enter.

NOTE: When a sensor does not hit within its programmed window, the controller will display a fault on its LCD display. This fault must be cleared before machine operation can begin again. To clear a fault, select the clear key followed by Enter. To program the mode in which a fault can be cleared, see Programming Mode(s) to Clear Faults.

7.3: Displaying Input's Last Hit

A *hit* of a die protection input is the position where a sensor detects something. After programming a die protection input, you may find during machine operation that the sensor consistently hits near a certain position. In this case, you may want to reduce the window that the sensor is monitoring within. But, before you do this, you must determine where the sensor is hitting. To display a die protection input's last hit, perform the following steps:

DIE PROT.

1. Select the die protection key.

   The controller displays "ENTER DIE PROTECTION NUMBER >>".

Select die input number

ENT

2. Select the die protection input. Select Enter.

   The controller displays "DIE #x LAST HIT: x". Further, the controller also displays the die protection input's programmed window.

C/CE C/CE

3. To return to the main display, select the clear key twice.

NOTE: The controller does not see a hit. The display will show none.

7.4: Programming Mode(s) to Clear Faults

You can program the mode(s) in which a die protection fault can be cleared within. There are two options: program mode only, or program and run mode. The Press-Set is defaulted to program mode only. To program the mode in which a fault can be cleared, perform the following steps:

F

7 3

ENT

1. Select the function key followed by function number 73. Select Enter.

   The controller displays "CLEAR DIE FAULT WITH KEY AT >> PROGRAM ONLY".

Select Mode

ENT

2. If you want die faults to be cleared when the controller is only in program mode, select Enter. However, if you want die faults to be cleared when the controller is in program or run mode, select the arrow key to select"RUN OR PROGRAM" and select Enter.

7.5: Programming a Remote Die Clear

Remote Die Clear allows the operator to reset a fault caused by a programmable die input from a remote area. This can be helpful when faults occur often during machine operation. It allows the operator to clear faults from a remote location. Remote die clear only clears programmable die protection faults, not constant monitor or brake faults. This is because the operator should take action to correct a constant monitor or brake fault (other than just clearing it) when it occurs.

The remote die clear feature is achieved by connecting the remote circuit to die protection input #11, found on the side of the controller (see Figure 7-4). This input is called out on the panel. When used in this way, this die protection input cannot be used for any other operation. To program die protection input #11 to act as a remote die clear, perform the following steps:

F 1 3 0 ENT

1. Select the function key followed by function number 130. This function uses die input #11 to clear faults. Select Enter.

   The controller displays "CLEAR DIE FAULT WITH REMOTE INPUT >> DISABLE".

→ ENT

2. Select the arrow key followed by Enter.

   The controller displays "REMOTE DIE FAULT CLEAR IS ENABLED". Die protection input #11 is now enabled for clearing programmable die protection faults.

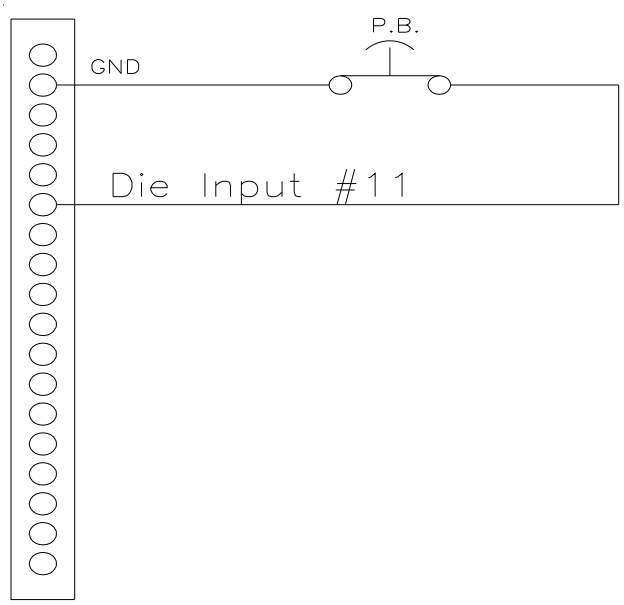


Figure 7-4 Connecting Die Input #11 to Remote Circuitry

7.6: Constant Monitor Inputs

The Press-Set contains three constant monitor inputs. These inputs allow up to three sensing devices to continuously monitor specific aspects of the press during machine operation. There are two N.C. inputs and one N.O. input. These inputs are found on the side of the controller. One way to use the N.O. input would be to connect a whisker sensor to the input to monitor for a buckle in metal being fed into the press. If a buckle is detected, the press will shut down and prevent the buckle from damaging the die. Another application could be used to sense for the end of stock. This would use a N.C. sensor.

7.7: Programming Constant Monitor Inputs

To program a constant monitor input, perform the following steps:

F 6 2 ENT

1. Select the function key followed by function number 62. Select Enter.

   The controller displays "RELAY SETTING FOR >> CONSTANT MONITOR 1".

ENT

2. Select Enter.

   The controller displays "CONSTANT MONITOR 1 RELAY >> ESTOP". The controller defaults all three of the constant monitors to de-energize the E-STOP relay if a fault occurs.

Follow Step 3

3. If you wish constant monitor 1 (N.C.) to de-energize the E-STOP relay if a fault occurs, select Enter. If you wish it to de-energize the auxiliary relay, select the arrow key to display AUX followed by Enter.

7.8: Slug Outs

Slug Outs are used to program a die protection input not to fault out under a programmed number of strokes if an input is not detected. This can be helpful when excess material, punched out from a die, occasionally exits the die only after several strokes. In normal conditions, because the excess material is not sensed leaving the die after each stroke, a fault would occur. The slug out feature compensates for this by allowing a fault to occur only when an input has not been detected up to a programmed number of strokes. The controller will count the number of times the input is not detected. If the programmed number is reached, a fault will occur. Note that excess material sensed does not necessarily mean all excess material built up has been detected. It only takes one piece of excess material to be detected to cause the counter to reset to zero. Slug outs can only be used with programmed die protection inputs, not with constant monitor inputs.

7.9: Enabling Slug Outs

Before programming a slug out, you must first enable the slug out function. To do this, perform the following steps:

F
8 9
ENT

1. Select the function key followed by function number 89. Select Enter.

   The controller displays "SLUG OUT FEATURE OF DIE PROT. IS >> DISABLE".

→
ENT

2. To enable the slug out function, select the arrow key to choose ENABLE. Select Enter.

   The controller displays "SELECT DIE >> NONE".

Enter die input number
ENT
C/CE

3. Select the die protection input you wish to program a slug out to. Select Enter.

   The controller prompts you to enter another die protection input. Repeat step 3 if you wish to enter another input. Otherwise, select the clear key.

7.10: Programming Die Protection Inputs with Slug Outs

DIE PROT.

4. Select the die protection key.

   The controller displays "ENTER DIE PROTECTION NUMBER >>".

Enter die input number
ENT

5. Enter the die protection input number you had previously selected in step 3. Select Enter

   The controller displays "DIE #x LAST HIT: NONE ON : NONE OFF: NONE". (x represents the number you selected in step 5.)

NOTE: If you had previously entered dwell positions for the input, you can bypass steps 7-10 by simply selecting Enter four (4) times while disregarding the following four prompts.

Enter beginning stroke position

ENT

6. Select the position of the stroke in which the sensor should begin sensing. Select Enter.

Enter ending stroke position

ENT ENT

7. Select the position of the stroke in which the sensor should stop sensing. Select Enter twice.

   The controller displays "DIE #x OPERATION N.O./N.C. >> N.O.".

Follow Step 8

8. If the sensor is normally open, select Enter. If the sensor is normally closed, select the arrow key to choose N.C. and then select Enter.

   The controller displays "DIE #x RELAY ESTOP/AUX >> ESTOP".

Follow Step 9

9. If you want the E-STOP relay to become de-energized if a fault occurs during machine operation, select Enter. If you want the auxiliary relay to become de-energized if a fault occurs during machine operation, select the arrow key to choose AUX, and then select Enter.

   The controller displays "DIE #x ACTIVE DURATION >> MOMENTARY".

Follow Step 10

10. If you want the sensor to operate in the momentary mode, select Enter. If you want the sensor to operate either in the maintain or partial revolution constant monitor mode, select the arrow key to choose either one, and then select Enter. (For more information on what the momentary, maintain, and partial revolution constant monitor modes are and how they work, see 7.1: Applications for Die Protection Inputs.)

    The controller displays "ENTER SLUG COUNT (1 to 9) >> 1". The controller is giving you the option to program between 1 through 9 strokes. The number you choose will be the number of strokes that will occur during machine operation before the die protection input must be sensed. The number of strokes you choose is called a *slug count*.

Enter slug count

ENT

C/CE

11. Enter your slug count followed by Enter and then the clear key to return to the main display.

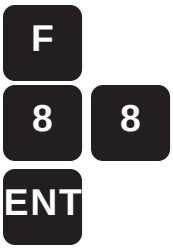
NOTE: Each counter is reset when its programmed die protection sensor senses material.

7.11: Disable Programmed Die Protection Inputs

The Press-Set has the ability to disable programmed die protection inputs during a programmed amount of strokes. This can be helpful when beginning an operation. This is because during the beginning of an operation, material may not yet fully pass through all the stations of a die. As a result, die protection sensors will fault because they have not yet sensed the material. This would force the operator to clear all the programmed die protection faults, until the material passed through all the die protection sensors. To remedy this, the controller can be programmed to ignore its programmed die protection inputs from 1-99 strokes. After the programmed strokes occur, the controller will re-enable the die protection inputs. This feature will only ignore programmed die protection inputs, not constant monitor inputs which can check for buckles in material being fed into the press.

7.12: Disabling Die Protection Inputs

To disable die protection inputs for a programmed number of strokes, perform the following steps:



1. Select the function key followed by function number 88. Select Enter.

   The controller displays “ENABLE/DISABLE DIE PROTECTION >> ENABLED”.

2. To display DISABLE, select the arrow key. Select Enter.

   The controller displays “ENTER # OF STROKES DIE PROT. IS DISABLED >> 25”. The controller is defaulted to disable programmed die protection inputs for 25 strokes.

Follow Step 3

3. If you want to disable programmed die protection inputs for 25 strokes, Select Enter. If you want to change the defaulted value of 25, enter a new value followed by Enter. Valid entries are from 1 to 99.

   The controller displays how many strokes will occur while programmed die protection inputs are disabled. The controller then returns to the main display.

NOTE: Once disabled, you can enable the die protection inputs at anytime during machine operation. To do this, perform step 1 followed by the arrow key and Enter.

Chapter 8: Counters

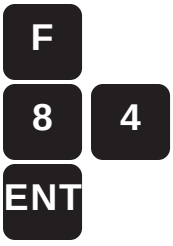
The Press-Set provides three types of counters: stroke, batch, and total. When programmed, a counter will increment each time an event occurs, except for the stroke counter which increments each time a stroke occurs. When the programmed value is met, the controller can be programmed to initiate an action. For example, a batch counter could be used to count the number of good parts produced by the press that fall into a hopper. When the batch counter's value is met (when the hopper is filled) the controller could stop the press. This would allow time for someone to change the filled hopper with an empty one. This chapter describes each of the three counters and provides instructions on programming them.

8.1: Stroke Counters

The stroke counter counts the number to strokes that occur during machine operation. This can be helpful to the operator. The stroke counter can be viewed and cleared at anytime. The following are instructions on how to view and clear the stroke counter.

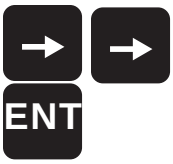
Displaying the Stroke Counter

You can program the Press-Set to continuously display the stroke counter. To do this, perform the following steps:



1. Select the function key followed by function number 84. Select Enter.

   The controller displays "INFORMATION TO BE DISPLAYED>> BATCH CNTR".



2. Select the arrow key twice to choose stroke counter. Select Enter.

   The stroke counter will now be displayed on the controller's LCD display (STK = x).

Clearing the Stroke Counter

To clear the stroke counter, perform the following steps:

CNTR

1. Select the counter key.

   The controller displays “1-STROKE 2-BATCH 3-TOTAL SELECT COUNTER>>”.

1

ENT

2. Select 1 followed by Enter key.

   The controller displays “STROKE = x PRESS <ENT> TO CLEAR”.

ENT

3. Select Enter.

   The controller displays “CLEAR COUNTER TO ZERO ARE YOU SURE? y/N”.

→

ENT

4. Select the arrow key to select y (yes). Select Enter.

C/CE

5. To return to the main display, select the clear key.

8.2: Batch Counters

When programmed, the batch counter can de-energize either the auxiliary or E-STOP relay, or energize limit switch 16 when the batch counter’s value is met. The counter resets itself after the programmed time value is reached. A sensor, connected to one of the controller’s die protection inputs, increments the batch counter each time it senses something, such as a part being ejected. Thus, when the batch counter increments to the programmed value, one of the fault relays or limit switch 16 will change state. Limit switch 16 can be connected to any type of device the user finds useful to be activated when the batch counter’s value is met. Such a device could be an external controller that would simply inform the operator that the batch counter’s value has been met, without stopping the press.

Programming a Batch Counter

Programming a batch counter involves a series of steps that must be performed in the following order:

1. Selecting a Die Input
2. Selecting the Auxiliary or E-STOP Relay or Limit Switch 16
3. Programming the Batch Counter Value
4. Enabling the Batch Counter.

Selecting a Die Input

The first step in programming a batch counter is to select one of the controller's 12 die protection inputs found on the controller's side panel. The selected die input will eventually activate the batch counter depending on what was programmed. This die input is typically used to sense the ejection of a good part. To select a die input that will activate the batch counter, perform the following steps:

F
7 7
ENT

1. Select the function key followed by function number 77. Select Enter.

   The controller displays "BATCH REFERENCE ENTER DIE INPUT # >> x".

Select corresponding die input number
ENT

2. Select the number that corresponds to the die input that your sensor is connected to. This sensor should be used to sense when a part is completed or ejected from the press. Select Enter.

   The controller displays "BATCH REFERENCE INPUT #x". (Continue to Selecting the Auxiliary or E-STOP Relay or Limit Switch 16.)

Selecting the Auxiliary or E-STOP Relay or Limit Switch 16

After selecting a die input, you must now select either the auxiliary or E-STOP relay, or limit switch 16. When selected, the auxiliary or E-STOP relay will de-energize, or limit switch 16 will energize (depending on which one you choose). Limit switch 16 is provided as an alternative from stopping the press. You can connect any type of device to this limit switch, such as an alarm. To select one of the fault relays or limit switch 16, perform the following steps:

F 7 8 ENT

3. Select the function key followed by function number 78. Select Enter.

   The controller displays “BATCH COUNTER RELAY >> AUX”.

Follow step 4

4. If you want the auxiliary relay to de-energize when the batch counter is met, select Enter. If you want limit switch 16 to energize when the batch counter is met, select the arrow key once followed by Enter. If you want the E-STOP to de-energize, select the arrow key twice followed by Enter.

   If you selected the auxiliary relay, the controller displays “ENTER DELAY >> X.XX”. You have a choice of entering from .001 to 9.99 seconds. The time entered will be the time the auxiliary relay will be de-energized after the batch counter is met. Enter the time value followed by Enter.

   If you selected the E-STOP relay, the controller will display “BATCH COUNTER WILL TRIP ESTOP RELAY”. The controller will return to the main display.

   If you selected the limit switch 16, the controller will display “BATCH COUNTER WILL TRIP LIMIT SWITCH 16”. The controller will return to the main display. (Continue to Programming the Batch Counter Value.)

Programming the Batch Counter Value

When the batch counter value is met during machine operation, the auxiliary or E-STOP relay will de-energize, or limit switch 16 will energize (depending on which one you choose). To program a value for the batch counter, perform the following steps:

CNTR

5. Select the counter key.

   The controller displays “1-STROKE 2-BATCH 3-TOTAL SELECT COUNTER>>”.

2
ENT

6. Select 2 followed by Enter key.

The controller displays “BATCH COUNTER ACTUAL/PROG >> ACTUAL”.

→
ENT

7. Select the arrow key to change ACTUAL to PROG followed by Enter.

The controller displays “PROG.BATCH = N.P. PRESS <ENT> TO CHANGE”. (N.P. stands for Not Programmed.)

NOTE: If the controller displays “PROG.BATCH = x PRESS<ENT> TO CHANGE” with x consisting of a value, the batch counter already has a programmed value. To change a previously programmed value, see Changing the Batch Counter Value.

ENT

8. Select Enter.

The controller displays “ENTER NEW COUNTER VALUE >>N.P.”.

Enter a value
ENT

9. Enter a value. When this value is met, the auxiliary or E-STOP relay will de-energize, or limit switch 16 will energize (depending on which one you chose.). Select Enter.

The controller displays “NEW PROGRAMMED BATCH COUNTER IS x”.

C/CE

10. To return to the main display, select the clear key. (Continue to Enabling the Batch Counter.)

Enabling the Batch Counter

Perform the following steps to enable the batch counter:

F
7 6
ENT

11. Select the function key followed by function number 76. Select Enter.

The controller displays “ENABLE/DISABLE COUNTERS >> DISABLE”.

→ ENT

12. Select the arrow key followed by Enter.

The batch counter is now programmed and ready for operation. To learn more about the batch counter, continue reading this section.

Changing the Batch Counter Value

To change the batch counter value, perform the following steps:

CNTR

1. Select the counter key.

The controller displays "1-STROKE 2-BATCH 3-TOTAL SELECT COUNTER >>".

2 ENT

2. Select 2 followed by Enter.

The controller displays "BATCH COUNTER ACTUAL/PROG >> ACTUAL".

→ ENT

3. Select the arrow Key to change ACTUAL to PROG followed by Enter.

The controller displays "PROG.BATCH = x PRESS <ENT> TO CHANGE".

ENT

4. Select Enter.

The controller displays "ENTER NEW COUNTER VALUE>> x".

Enter a value
ENT

5. Enter a value. When this value is met, the auxiliary or E-STOP relay will de-energize, or limit switch 16 will energize (depending on which one you choose). Select Enter.

The controller displays "NEW PROGRAMMED BATCH COUNTER IS x".

C/CE

6. To return to the main display, select the clear key.

Viewing the Actual Batch Counts

During machine operation, you may wish to view the actual times the batch counter has incremented. To do this, perform the following steps:

CNTR

1. Select the counter key.

   The controller displays “1-STROKE 2-BATCH 3-TOTAL SELECT COUNTER >>”.

2

ENT

2. Select 2 followed by Enter.

   The controller displays “BATCH COUNTER ACTUAL/PROG >> ACTUAL”.

ENT

3. Select Enter.

   The controller displays “ACTUAL BATCH = x PRESS <ENT> TO CLEAR.

C/CE

C/CE

4. To return to the main display, select the clear key twice.

Clearing the Batch Counter

During machine operation, you may wish to clear the batch counter to zero before it reaches its programmed value. To do this, perform the following steps:

CNTR

1. Select the counter key.

   The controller displays “1-STROKE 2-BATCH 3-TOTAL SELECT COUNTER >>”.

2

ENT

2. Select 2 followed by Enter.

   The controller displays “BATCH COUNTER ACTUAL/PROG >> ACTUAL”.

ENT

3. Select Enter.

The controller displays “ACTUAL BATCH = x PRESS <ENT> TO CLEAR.

ENT

4. Select Enter.

The controller displays “CLEAR COUNTER TO ZERO ARE YOU SURE? y/N”.

→

ENT

5. Select the arrow key to choose y (yes). Select Enter.

The controller displays “ACTUAL BATCH COUNTER HAS BEEN CLEARED”.

C/CE

6. To return to the main display, select the clear key.

Displaying the Batch Counter

You can program the Press-Set to continuously display the batch counter. To do this, perform the following steps:

F

8 4

ENT

1. Select the function key followed by function number 84. Select Enter.

The controller may display either “INFORMATION TO BE DIS PLAYED >> TOTAL CNTR” or “INFORMATION TO BE DIS PLAYED >> STROKE CNTR”.

Select batch counter

ENT

2. Using the arrow key, select “BATCH CNTR” followed by Enter.

The batch counter will now be displayed on the controller’s LCD display (BAT = x).

8.3: Total Counters

When programmed, the total counter can de-energize the E-STOP relay. A sensor, connected to one of the controller's die protection inputs, increments the total counter each time it senses something, such as a part being ejected. Thus, when the total counter increments to the programmed value, the E-STOP relay will de-energize. The total counter can be used to stop the press when a job has been completed.

Programming/Viewing the Total Counter Value

To program or view a value for a batch counter, perform the following steps:

CNTR

1. Select the counter key.

   The controller displays "1-STROKE 2-BATCH 3-TOTAL SELECT COUNTER >>".

3

ENT

2. Select 3 followed by Enter.

   The controller displays "TOTAL COUNTER ACTUAL/PROG >> ACTUAL".

→

ENT

3. Select the arrow key followed by Enter.

   The controller displays "PROG TOTAL = N.P. PRESS <ENT> TO CHANGE". (N.P. stands for Not Programmed)

NOTE: If the controller displays "PROG. TOTAL = x PRESS <ENT> TO CHANGE" with x consisting of a value, the total counter already has a programmed value. To change a previously programmed batch counter value, see Changing the Total Counter Value.

ENT

4. Select Enter.

   The controller displays "ENTER NEW COUNTER VALUE>> N.P.".

Enter a value

ENT

5. Enter a value. Select Enter.

   The controller displays "NEW PROGRAMMED COUNTER TOTAL IS x".

C/CE

6. To return to the main display, select the clear key.

Changing the Total Counter Value

To change the total counter value, perform the following steps:

CNTR

1. Select the counter key.

   The controller displays “1-STROKE 2-BATCH 3-TOTAL SELECT COUNTER >>”.

3
ENT

2. Select 3 followed by Enter.

   The controller displays “TOTAL COUNTER ACTUAL/PROG >> ACTUAL”.

→
ENT

3. Select the arrow key to change ACTUAL to PROG followed by Enter.

   The controller displays “PROG.TOTAL = x PRESS <ENT> TO CHANGE”.

ENT

4. Select Enter.

   The controller displays “ENTER NEW COUNTER VALUE>>x”.

Enter a value
ENT

5. Enter a value. When this value is met, the E-STOP relay will de-energize. Select Enter.

   The controller displays “NEW PROGRAMMED TOTAL COUNTER IS x”.

C/CE

6. To return to the main display, select the clear key.

Viewing the Actual Total Counts

During machine operation, you may wish to view the actual times the total counter has incremented. To do this, perform the following steps:

CNTR

1. Select the counter key.

   The controller displays “1-STROKE 2-BATCH 3-TOTAL SELECT COUNTER >>”.

3
ENT

2. Select 3 followed by Enter.

The controller displays “TOTAL COUNTER ACTUAL/PROG >> ACTUAL”.

ENT

3. Select Enter.

The controller displays “ACTUAL TOTAL = x PRESS <ENT> TO CLEAR”.

ENT

4. Select Enter.

The controller displays “CLEAR COUNTER TO ZERO ARE YOU SURE? y/N”.

→
ENT

5. Select the arrow key to choose y (yes). Select Enter.

The controller displays “ACTUAL TOTAL COUNTER HAS BEEN CLEARED”.

C/CE

6. To return to the main display, select the clear key.

Displaying the Total Counter

You can program the Press-Set to continuously display the total counter. To do this, perform the following steps:

F
8 4
ENT

1. Select the function key followed by function number 84. Select Enter.

The controller may display either “INFORMATION TO BE DIS PLAYED >> BATCH CNTR” or “INFORMATION TO BE DIS PLAYED >> STROKE CNTR”.

Select total counter
ENT

2. Select the arrow key to select “TOTAL CNTR” followed by Enter.

The total counter will now be displayed on the controller’s LCD display (TOT=x).

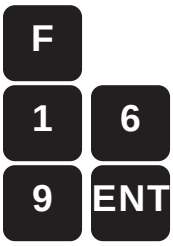
Chapter 9: Optional D25 Port

The Press-Set comes with a D25 port located at the bottom of the controller. This port can be used to transmit the resolver's position or Strokes Per Minute (SPM); counterbalance pressure adjustment data; failed die protection input data; or the Press-Set's active program number. The output used for the resolver's position and SPM and the active program number can be selected on the Press-Set in the form of binary, Binary Coded Decimal (BCD), or grey code. This data would typically be used by a PLC. Failed die protection input data can be used with a series of lights (each light representing a particular die protection input) which could inform the operator on which die protection input failed. Data sent to Gemco's Series 2200 counterbalance system is used to automatically adjust the press's counterbalance pressure based on a program's counterbalance pressure setting. The Press-Set is defaulted to send counterbalance data out through the port. Applications that could be used with the D25 port are selecting a program number to tell a PLC what job number the Press-Set is running; or selecting a position to tell what position the Press-Set is in. This could be used for an in die transfer application.

NOTE: If the Port Data Value is set for Position or SPM, then Die Protection input 12 will be set to Latch.

Selecting Port Data Value

You can select the type of data the controller's D25 port will output. You can send position or SPM data, failed die protection input data, counterbalance pressure data, or the controller's active program number. The controller is defaulted to send out counterbalance pressure data. To change the controller's port data value (type of data), perform the following steps:



1. Select the function key followed by function number 169. Select Enter.

   The controller displays "DIGITAL OUTPUT VALUE >> COUNTER BAL".

Follow step 2

2. Using the arrow key, scroll through the available port data values. Select either COUNTER BAL to send counter balance pressure data; PROGRAM NUMBER to send data on the controller's active program number; POS to send position data; SPM to send strokes per minute data; or DIE HIT to send failed die protection input data. Select Enter.

   If you have selected either PROGRAM NUMBER, POS, OR SPM, see Selecting Port Data Type for final instructions. If you have selected COUNTER BAL, see Programming Counterbalance Range.

Selecting Port Data Type

The data type sent through the D25 port for the resolver's position and SPM and controller's active program number can be selected on the Press-Set in the form of binary, BCD, or grey code. This data would typically be used by a PLC. The controller is defaulted to BCD. To select the data type that will be sent through the controller's port, perform the following steps:

F
8 5
ENT

1. Select the function key followed by function number 85. Select Enter.

   The controller displays "ENTER OUTPUT TYPE FOR PORT >> BCD".

Follow step 2

2. Using the arrow key, scroll through the available port data types to select one. Select Enter.

   The controller is defaulted to send output that is true when high. To change the output's condition to be true when low, see True-High or True-Low.

True-High or True-Low

You can change the D25 port's output to be true when high or true when low. The controller is defaulted to produce output that is true when high. To change the output to be true when low, perform the following steps:

F
7 5
ENT

1. Select the function key followed by function number 75. Select Enter.

   The controller displays "OUTPUT TRUE OFF/ON >> ON".

→ ENT

2. Select the arrow key followed by Enter.

   The D25 port's output is programmed to true when low.

Programming Counterbalance Range

The controller can send a 4-bit binary number through its D25 port to Gemco's Series 2200 counterbalance system. This number represents the counterbalance pressure for a particular program. When a counterbalance pressure is set in a program, the press's counterbalance pressure will be automatically adjusted when the program is accessed from the controller's memory. Before a specific counterbalance pressure can be set for a program, a counterbalance range must be programmed. Once a minimum and maximum setting are made, the controller evenly divides 16 settings from the minimum to the maximum setting. If a range is not programmed, the controller will default to 255 psi for all programs. To program a counterbalance range, perform the following steps:

F, 1, 4, 1, ENT

1. Select the function key followed by function number 141. Select Enter.

   The controller displays "CNTR BALANCE PRESSURES MIN: NONE MAX: NONE".

Enter minimum pressure

ENT

2. Enter the minimum counterbalance pressure. Select Enter.

Enter maximum pressure

ENT

3. Enter the maximum counterbalance pressure. Select Enter.

C/CE

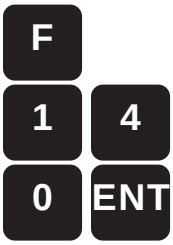
4. Select the clear key.

   The controller displays "CNTR BAL RANGE SET TO :MIN: x PSI MAX: x PSI" and returns to the main display.

   To program a counterbalance pressure for a particular program, see Programming a Counterbalance Pressure for a Program.

Programming a Counterbalance Pressure for a Program

When a counterbalance pressure is set in a program, the press's counterbalance pressure will be automatically adjusted when the program is accessed from the controller's memory. If a counterbalance pressure is not set, the controller will default to the minimum setting made in function 141 (If you have not yet programmed a counterbalance range, see Programming Counterbalance Range). To program a counterbalance pressure for a particular program, perform the following steps:



1. Select the function key followed by function number 140. Select Enter.

   The controller displays "COUNTERBALANCE >> x PSI ENT VAL OR -> TO SCROLL".

Enter pressure

2. Enter the counterbalance pressure. You can either enter the pressure by using the data entry keypad or by scrolling through the list of stored pressures by using the arrow key. Select Enter.

   The controller displays "COUNTER BALANCE IS NOW SET TO x PSI" and returns to the main display.

NOTE: The Press-Set must be in the active program in order for you to program counterbalance pressure for that particular program.

Chapter 10: Operations Instructions

10.1: Serial Communication Protocol for Press-Set

The serial communication for the 1992 Press-Set is designed to communicate with a personal computer or with an Allen-Bradley PLC using RS-485.

All data will be passed in binary format. Valid baud rates for transmission are: 19200, 9600, 4800, 2400 and 1200. Each transmission byte is 8 data bits long, with one start bit, one stop bit, and an optional parity bit. Parity can be set at odd, even, or none. Both the baud rate and the parity are programmable via keypad function 82.

The following is a list of control symbols used for the protocol:

Symbol	Hex Value	Description
DLE STX	0x10 0x02	Start of message packet
DLE ETX	0x10 0x03	End of message packet with CRC to follow in the next 2 bytes
DLE ACK	0x10 0x06	Response that indicates message has been received successfully
DLE NAK	0x10 0x15	Response that indicates message was not received successfully
DLE ENQ	0x10 0x05	Sender is requesting the re-transmission of the last response symbol (DLE ACK or DLE NAK)
DLE DLE	0x10 0x10	Data symbol. When a 0x10 is sent in the data packet, it must be preceded by another 0x10. This is used to indicate that the 0x10 is a data byte and not the start of a control symbol.

10.2: Message Packet

The message packet that is sent to the Press-Set controller is as follows:

DLE	STX	DST ADDR	SRC ADDR	CMD	STS	TNS	DATA	DLE	ETX	CRC
0x10	0x02	xx	xx	xx	xx	xxxx	xx...xx	0x10	0x03	xxxx

Where:
- DLE STX -start of transmission
- SDT ADDR -destination address
- SRC ADDR -source address
- CMD -command byte
- STS -status byte in command message for file transfers
  error byte in reply message for file transfers
- TNS -two-byte transmission number
  each message packet must contain a unique 16 bit number. This is used to distinguish between different message packets received. The response message packet will contain the same transmission number. This number is sent low byte first.
- DATA -data bytes
  if command byte is a 0xFF, then this field will contain the function protocol designed for the 1992.
- DLE ETX -end of message packet
- CRC -two-byte cyclic redundancy check. This number is sent low byte first.

When communicating with the 1992 Press-Set controller using single-command communications, the CMD byte will contain the command 0xFF. This will indicate to the Press-Set controller, that the Press-Set serial protocol will be in the data field of the message packet. A command of 0x0F will be used to perform downloading and uploading of the file packets.

10.3: Cyclic Redundancy Check (CRC)

A Cyclic Redundancy Check (CRC) is used to confirm the validity of the data received. The CRC is sent at the end of the message packet right after the DLE ETX. The following is an algorithm for calculating the CRC.

1. At the beginning of the message, the 16 bit CRC register is set to zero.
2. As data is sent, the data is “exclusive-OR”ed with the CRC register’s lower byte.
3. After the data is “exclusive-OR”ed, the CRC is then shifted to the right 8 times and 0’s are shifted in at the left. As the bits are shifted out, they are checked. If the bit is a 1, then the CRC is “exclusive-OR”ed with the following constant:

   1010 0000 0000 0001 + 0xA001

4. Steps 2 and 3 are repeated for each data byte in the message packet.

The CRC data bytes include all the data bytes between the DLE STX and the DLE ETX, including the ETX. It does not include any control symbols that may be embedded in the message packet. When a DLE DLE is sent in the message packet, only one of the DLE's is included in the CRC.

Example:

DLE	STX	DST ADDR	SRC ADDR	CMD	STS	TNS
0x10	0x02	0x01	0x02	0xFF	0x00	0x01 0x00

FNC	INQ
0x10	0x00

DLE	ETX	CRC
0x10	0x03	0xAF 0x47

NOTE: The two-byte CRC & TNS values are sent out low byte first.

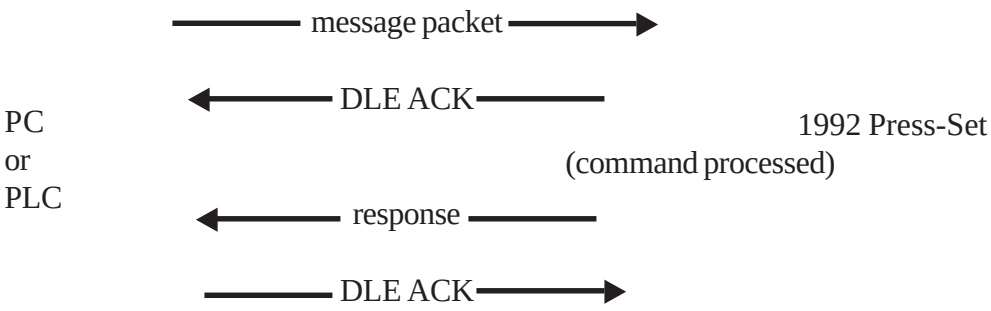
Chapter 11: Single Command Communications

11.1 Communication Between Devices

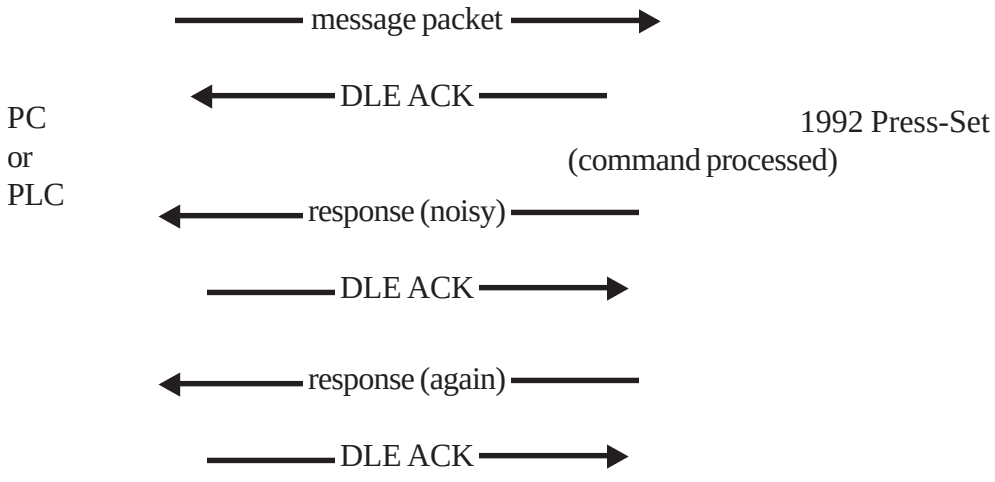
When a message packet is sent to the Press-Set, it will read in the data and calculate the CRC. If there was no parity, noise, or framing error and the CRC was correct, the unit will send back a DLE ACK and start to analyze the contents of the string and perform the requested function. After the command has been processed, the Press-Set will then send back a response message packet and will wait for either a DLE ACK or a DLE NAK. If a DLE ACK is received, then the response packet was received with no parity, framing, noise or CRC errors. If a DLE NAK was received, then the Press-Set will re-send the response message and wait again for a reply of either DLE ACK or DLE NAK. The Press-Set will re-send the response up to 3 times before it will stop.

If no reply is received within 3 seconds, the Press-Set will send out a DLE ENQ. This is asking the device to re-send the last reply (DLE ACK or DLE NAK) that was sent out. The Press-Set will send out a maximum of 10 DLE ENQ's if no reply is received from any of the attempts.

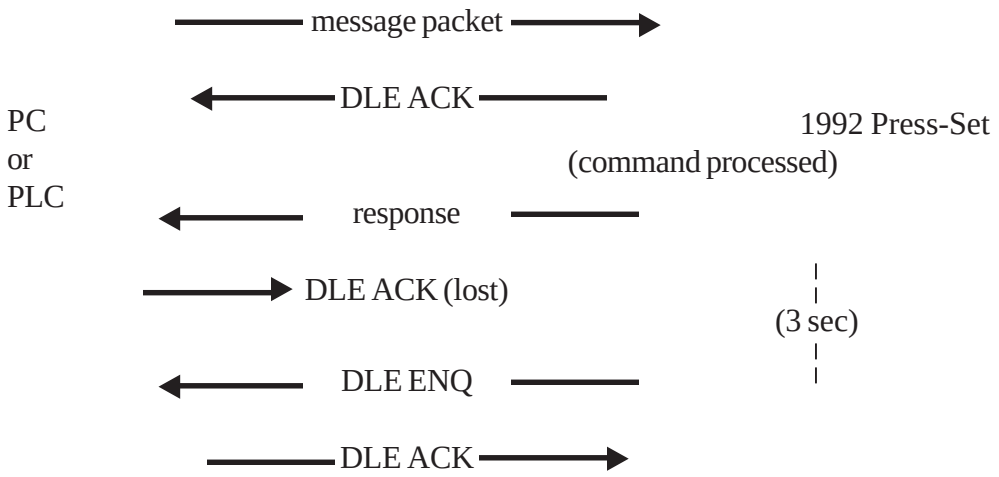
The following is an example of a successful communication:



The following is an example where the response message is received incorrectly the first time, but is retransmitted and is received correctly the second time.



The following is an example of where the DLE ACK was lost in the transmission.



11.2: Single Command Overview

In the Press-Set controller protocol, there are two types of functions that can be sent in the single command format. The first is known as an inquire function, which will send back the information that is requested. The second is known as a program function, which will change the data in the Press-Set:

When using the Press-Set protocol, the message packet will be as follows:

Header:

DLE	STX	DST ADDR	SRC ADDR	CMD	STS	TNS
0x10	0x02	xx	xx	0xFF	xx	xxxx

Data field of messge packet protocol contains the Press-Set protocol:

FNC	INQ/PRG	DATA
xx	0x00 or 0x01	xx...xx

End of message packet:

DLE	ETX	CRC
0x10	0x03	xx xx

Where FNC - Function number
INQ/PRG - inquire or program byte
00 - inquiry
01 - program

DATA - data field (optional) contains any data that is needed for the specific function

The Press-Set will perform the function and send back a response message packet. The response packet will contain the same transmission number as the command message packet.

The protocol for the response found in the data field of the message packet is as follows:

Header:

DLE	STX	DST ADDR	SRC ADDR	CMD	STS	TNS
0x10	0x02	xx	xx	0xFF	xx	xxxx

Data field of message packet protocol contains the Press-Set protocol:

FNC	INQ/PRG	DATA
xx	0x00 or 0x01	xx...xx

End of message packet:

DLE	ETX	CRC
0x10	0x03	xx xx

Where FNC - Function number
CFM/ERR - confirm or error byte
00 - no errors and function was carried out
xx - error number and function was not done. Table 1 is a list of error numbers.
DATA - contains any data that was requested.

Error Number	Hex Value	Description
1	0x01	Invalid function number
2	0x02	Invalid die protection number
3	0x03	Invalid limit number
4	0x04	Invalid data
5	0x05	Invalid sensor input
6	0x06	Invalid die on value
7	0x07	Invalid die off value
8	0x08	Invalid relay
9	0x09	Die on and die off values cannot be equal

10	0x0A	Error in adding dwell on setting
11	0x0B	Error in adding dwell off setting
12	0x0C	Limit is not programmed as indicated
13	0x0D	Timed off value is incorrect
14	0x0E	All dwells must be deleted before the limit can be changed to timed off
15	0x0F	Dwell setting is currently not in the list
16	0x10	Invalid counter value
17	0x11	Invalid window parameter
18	0x12	Invalid number of steps for speed compensation
19	0x13	Invalid SPM value
20	0x14	SPM value is already in the step table
21	0x15	Invalid offset value
22	0x16	Dwell on and Dwell off value cannot be equal
23	0x17	Batch and total counters must be programmed
24	0x18	Format error - not enough data bytes sent in packet
25	0x19	Program error - this function cannot be programmed
26	0x1A	Inquire error - this function cannot be inquired
27	0x1B	INQ/PRG byte is not a 0 or a 1
28	0x1C	Resolver is moving - setpoints and die information cannot be programmed
29	0x1D	Die operation value was invalid
30	0x1E	Combination of digital outputs is invalid
31	0x1F	Invalid counter balance range (F141 values)
32	0x20	Maximum number of PCA limits has been reached
33	0x21	Serial entry for Ram-Set passcode is incorrect
34	0x22	Die input 12 is used as a latch when Func85 set to SPM or POS
35	0x23	Invalid count entered
36	0x24	Die input 12 was programmed, but is now used as a latch
37	0x25	Slow down or drift range is out of given parameters
38	0x26	Shut height upper and/or lower limit is unacceptable
39	0x27	Shut height value does not fall within given upper and lower limits
40	0x28	Function 85 is invalid while Ram-Set/counter balance is selected for function 169

TABLE 1: Error Codes

11.3: Function List for Press-Set Serial Communication Protocol

The following is a list of the functions that are implemented by the 1992:

General Inquiry Functions

01 (0x01)	Inquire or change program number
02 (0x02)	Inquire on current strokes per minute
03 (0x03)	Inquire on current position
04 (0x04)	Inquire on fault information
05 (0x05)	Inquire on number of programs used and list programs

Brake Monitor Functions

10 (0x0A)	Inquire actual stop distance, actual stop time and acceptable stop time

Limit Functions

20 (0x14)	List all dwell on setpoints for requested limit number or program a new dwell on setpoint
21 (0x15)	List all dwell off setpoints for requested limit number or program a new dwell off setpoint
22 (0x16)	Change dwell off from position to timed or from timed to position
23 (0x17)	Change dwell on setpoint for requested limit number
24 (0x18)	Change dwell off setpoint for requested limit number
25 (0x19)	Clear dwell on setpoint for requested limit number
26 (0x1A)	Clear dwell off setpoint for a requested limit number

Die Protect Functions

30 (0x1E)	Inquire or change parameters for requested die number

Counter Functions

40 (0x28)	Inquire or clear stroke counter
41 (0x29)	Inquire or clear actual batch counter
42 (0x2A)	Inquire or clear actual total counter
43 (0x2B)	Inquire or change programmed batch counter
44 (0x2C)	Inquire or change programmed total counter

General Functions

50 (0x32)	Inquire or change decimal point
60 (0x3C)	Inquire or change PCA limits and values
62 (0x3E)	Inquire constant monitor relay settings
71 (0x47)	Inquire on software revision
72 (0x48)	Inquire scale factor
73 (0x49)	Inquire or change whether die faults are cleared in run or program & run mode

74 (0x4A)	Inquire or change speed window parameters
75 (0x4B)	Inquire or change state of digital outputs
76 (0x4C)	Inquire or change whether batch and total counters are enabled or disabled
77 (0x4D)	Inquire or change which die protection input will be referenced for batch count operation
78 (0x4E)	Inquire or change whether ESTOP or AUX will energize upon the batch count being reached
80 (0x50)	Inquire or change which limits will operate with speed compensation
81 (0x51)	Inquire or change the number of steps the speed compensation ramp is to have
83 (0x53)	Inquire the RPM point at which the motion detect relay will energize
84 (0x54)	Inquire or change which counter is displayed on main menu
85 (0x55)	Inquire or change the digital output port to natural binary, binary coded decimal, or Grey code
89 (0x59)	Inquire or change whether slug out feature is enabled or disabled
91 (0x5B)	Clear all limit dwell information from the current program the controller is in
121 (0x79)	Inquire or change Ram-Set values
122 (0x7A)	Inquire or change Shut Height value
130 (0x82)	Inquire or change die fault clear input setting
140 (0x8E)	Inquire or change the counter balance pressure
141 (0x8D)	Inquire or change the counter balance ranges
163 (0xA3)	Inquire or change LED display at power-up
169 (0xA9)	Inquire or change whether the digital output port is position or SPM
191 (0xBF)	Clear all limit dwell information from all 200 programs

11.4: Protocol Formats for Single Command Functions

The following are the individual formats for the function packets. For all the functions, the header is as follows:

DLE	STX	DST ADDR	SRC ADDR	CMD	STS	TNS
0x10	0x02	xx	xx	0xFF	0x00	xxxx

The destination address is the address of the Press-Set. This address is programmable via keypad function 86.

The source address is the address of the computer or the PLC. This address cannot be equal to any of the Press-Set addresses.

The end of the message is as follows:

DLE	ETX	CRC
0x10	0x03	xx xx

The CRC is a two byte cyclic redundancy check. This is sent out low byte first. This error checking can be disabled through function 173. The 2 CRC bytes still need to be sent out if the CRC is disabled; however, the Press-Set will not check them against the CRC that is calculated.

11.5: Function 01 (Inquire)-Read Current Program Number

This function will send back the program number that is currently being run. The following message packet would be sent to the Press-Set.

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x01	0x00	4 bytes

The following response packet would be returned:

HEADER	FNC	CFM	PROGRAM #	END OF MESSAGE
8 bytes	0x01	0x00	1-999999999 (4 bytes)	4 bytes

With the LSB being the first byte received.

11.6: Function 01 (Program)-Change Current Program

This function will change the program number that is being run. The following message packet is sent to the Press-Set:

HEADER	FNC	PRG	NEW PROGRAM #	END OF MESSAGE
8 bytes	0x01	0x01	1-999999999 (1 byte)	4 bytes

The following response will be sent back:

HEADER	FNC	CFM	NEW PROGRAM #	SETPOINT FLAG	END OF MESSAGE
8 bytes	0x01	0x00	1-999999999 (4 bytes)	0x00-no setpoints are programmed 0x01-setpoints are programmed	4 bytes

With the LSB being the first byte sent.

The SETPOINT FLAG will indicate whether there are any setpoints programmed for the new program number.

11.7: Function 02 (Inquire)-Read Current Strokes per Minute (SPM)

This function will return the current SPM. The following message packet is sent to the Press-Set:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x02	0x00	4 bytes

The following response will be sent back:

HEADER	FNC	CFM	CURRENT SPM	END OF MESSAGE
8 bytes	0x02	0x00	(2 bytes)	4 bytes

NOTE: The SPM is an integer value and will be sent out low byte first.

11.8: Function 03 (Inquire)-Read Current Position

This function will send back the current position of the resolver. The following message packet is sent to the Press-Set.

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x03	0x00	4 bytes

The following response packet will be sent back:

HEADER	FNC	CFM	CURRENT POSITION	END OF MESSAGE
8 bytes	0x03	0x00	0-9999 (2 bytes)	4 bytes

NOTE: The position is an integer value and will be sent out low byte first.

11.9: Function 04 (Inquire)-Read Fault Information

This function is used to determine whether there is currently a fault. If there is, the fault condition(s) will also be returned. There are 23 different fault conditions:

1. Twelve die input fault
2. Three constant monitor fault
3. Primary shorted
4. Primary opened
5. S1 open
6. S4 open
7. Speed window error
8. Total count reached
9. Batch count reached
10. Brake Fault

The following message packet will be sent to the Press-Set to retrieve fault information:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x04	0x00	4 bytes

The following response packet will be returned:

FNC	CFM	# OF FAULTS	LIST OF FAULT CODES
0x04	0x00	0 - 23	(0 - 23 bytes)

If there are no fault conditions, the # OF FAULTS will return a 0x00 with no list. If there are any fault conditions, the # OF FAULTS will return the number of FAULT CODES that will follow in the list. Each fault has been assigned a unique 1 byte number that will be returned in the list. This is shown in Table 2.

FAULT	DECIMAL	HEX
Die Fault #1	01	0x01
Die Fault #2	02	0x02
Die Fault #3	03	0x03
Die Fault #4	04	0x04
Die Fault #5	05	0x05
Die Fault #6	06	0x06
Die Fault #7	07	0x07
Die Fault #8	08	0x08
Die Fault #9	09	0x09
Die Fault #10	10	0x0A
Die Fault #11	11	0x0B
Die Fault #12	12	0x0C
Constant Monitor Fault #1	13	0x0D
Constant Monitor Fault #2	14	0x0E
Constant Monitor Fault #3	15	0x0F
Primary Shorted	16	0x10
Primary Opened	17	0x11
S1 Open	18	0x12
S4 Open	19	0x13
Speed Window Error	20	0x14
Total Count Reached	21	0x15
Batch Count Reached	22	0x16
Brake Fault	23	0x17

TABLE 2: Fault Condition Codes

For example, if there was a fault on die input #2 and a constant monitor fault #3, the following would be returned:

HEADER	FNC	CFM	# OF FAULTS	DIE FAULT #2	C.M. FAULT #3	END OF MESSAGE
8 bytes	0x04	0x00	0x02	0x02	0x0F	4 bytes

11.10: Function 05 (Inquire)-List All Programs Being Used

This function will return the number of programs being used along with the list of the programs. Because the message packet is limited to only 255 bytes, including the header and end of message, the maximum number of programs that can be returned in one packet is 58. Each program number is 4 bytes long. There is a possibility of having up to 100/200 programs. In this case, more than one response packet will be sent out The message packet sent is as follows:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x05	0x00	4 bytes

The following response packet will be returned.

HEADER	FNC	CFM	TOTAL # OF PROGRAMS	OFFSET	LIST OF PROGRAMS
8 bytes	0x05	0x00	(1 byte) 0-200	1 byte	each program is 4 bytes

END OF MESSAGE
4 bytes

The TOTAL # OF PROGRAMS is the total number expected to be sent. If the number is greater than 58, then there will be more than one packet sent.

The OFFSET indicates what number program the list starts with. This is used to differentiate between multiple response packets.

The LIST OF PROGRAMS is a long integer list of the programs. Each program takes up 4 bytes of data.

NOTE: All long integer values are stored in the packet low byte first.

EXAMPLE: If the user wishes to retrieve the list of used programs, the following message packet would be sent:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x05	0x00	4 bytes

If the number of used programs is 100, then 2 response packets need to be sent. The first response packet will contain the TOTAL #OF PROGRAMS to be 100 (0x64), and the OFFSET to be 0, meaning this is the beginning of the list and the first 58 programs.

HEADER	FNC	CFM	TOTAL # OF PROGRAMS	OFFSET	LIST OF PROGRAMS
8 bytes	0x05	0x00	0x64	0x00	xxxx ... xxxx

END OF MESSAGE
4 bytes

The second response packet sent will contain in the TOTAL # OF PROGRAMS the number 100 (0x64) and in the OFFSET field the number 59 (0x3B), meaning that the first program in the packet list is the 59th program in the total list, followed by the remaining 41 programs.

HEADER	FNC	CFM	TOTAL # OF PROGRAMS	OFFSET	LIST OF PROGRAMS
8 bytes	0x05	0x00	0x64	0x3B	xxxx ... xxxx

END OF MESSAGE
4 bytes

11.11: Function 10 (Inquire)-Retrieve Actual Stop Distance, Stop Time, and Acceptable Stop Time

This function will send back the actual stop distance, the actual stop time, and the acceptable stop time. The following message packet is sent to the Press-Set:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x0A	0x00	4 bytes

The following response packet will be sent back:

HEADER	FNC	CFM	ACTUAL STOP DISTANCE	ACTUAL STOP TIME	ACCEPTABLE STOP TIME	END OF MESSAGE
8 bytes	0x04	0x00	(2 bytes)	(2 bytes)	(2 bytes)	4 bytes

NOTE: The actual stop distance, actual stop time, and acceptable stop time are all integer values and will be sent out low byte first.

11.12: Function 20 (Inquire)-List All Dwell On Setpoints For Requested Limit Number

This function will return the number of dwell on setpoints along with the list of the dwell on setpoints for the requested limit number. Because the message packet is limited to only 255 bytes, including the header, the maximum number of setpoints that can be returned is 110 in a packet. Each setpoint is 2 bytes long. There is a possibility of having up to 4096 dwell on setpoints programmed for each limit. In this case, more than one response packet will be sent out. The message packet sent is as follows:

HEADER	FNC	INQ	LIMIT #	END OF MESSAGE
8 bytes	0x14	0x00	1-16	4 bytes

The following response packet will be returned:

HEADER
8 bytes

FNC	CFM	LIMIT #	TOTAL # OF SETPOINTS	OFFSET	LIST OF SETPOINTS
0x14	0x00	1-16	(2 bytes) 0 - 4096	2 bytes	each setpoint is 2 bytes

END OF MESSAGE
4 bytes

The TOTAL # OF SETPOINTS is the total number expected to be sent. If the number is greater than 110, then there will be more than one packet sent.

The OFFSET indicates what number setpoint the list starts with. This is used to differentiate between multiple response packets.

The LIST OF SETPOINTS is an integer list of the setpoints. Each setpoint takes up 2 bytes of data.

NOTE: All integer values are stored in the packet low byte first.

EXAMPLE:

If the user wishes to retrieve the dwell on setpoints limit #5, the following message packet would be sent:

HEADER	FNC	INQ	LIMIT #	END OF MESSAGE
8 bytes	0x14	0x00	0x05	4 bytes

If the limit #5 has 232 setpoints, then 3 response packets need to be sent. The first response packet will contain the TOTAL # OF SETPOINTS to be 232 (00 E8), and the OFFSET to be 0, meaning this is the beginning of the list and the first 110 setpoints.

HEADER
8 bytes

FNC	CFM	LIMIT #	TOTAL # OF SETPOINTS	OFFSET	LIST
0x14	0x00	0x05	0xE8 0x00	0x00 0x00	xx ... xx

END OF MESSAGE
4 bytes

The second response packet sent will contain in the TOTAL # OF SETPOINTS the number 232 (00 E8) and in the OFFSET field the number 110 (00 6E), meaning that the first setpoint in the packet list is the 111th setpoint in the total list, followed by the remaining 110 setpoints.

HEADER
8 bytes

FNC	CFM	LIMIT #	TOTAL # OF SETPOINTS	OFFSET	LIST
0x14	0x00	0x05	0xE8 0x00	0x6E 0x00	xx ... xx

END OF MESSAGE
4 bytes

The third response packet sent will contain in the TOTAL # OF SETPOINTS the number 232 (00 E8) and in the OFFSET field the number 220 (00 DC), meaning that the first setpoint in the packet list is the 221st setpoint in the total list, followed by the remaining 12 setpoints.

HEADER
8 bytes

FNC	CFM	LIMIT #	TOTAL # OF SETPOINTS	OFFSET	LIST
0x14	0x00	0x05	0xE8 0x00	0xDC 0x00	xx ... xx

END OF MESSAGE
4 bytes

11.13: Function 20 (Program)-Enter New Dwell On Setpoint for Requested Limit Number

In order to enter a new dwell on setpoint for a specific limit number, the following command must be sent:

HEADER	FNC	PRG	LIMIT #	SETPOINT	END OF MESSAGE
8 bytes	0x14	0x01	1-16	0 - scale factor (2 bytes)	4 bytes

NOTE: The dwell setting is an integer value from 0 to scale factor and should be sent low byte first.

The following response packet will be returned:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0x14	0x00	4 bytes

11.14: Function 21 (Inquire)-List All Dwell Off Setpoints for Requested Limit Number

A dwell off for a limit number can be programmed as either position off or timed off. This function will return the limit number, which way it is programmed and either the list of the dwell off setpoints (if it is programmed as position off) or the programmed time (if it is a timed off).

The following is the message packet sent to the Press-Set:

HEADER	FNC	INQ	LIMIT #	END OF MESSAGE
8 bytes	0x15	0x00	1-16	4 bytes

The following response will be returned:

HEADER	FNC	CFM	LIMIT #	POS/TIMED	DATA	END OF MESSAGE
8 bytes	0x15	0x00	1-16	0x00 - position 0x01 - timed	Position - list of setpoints Timed - 2 byte time value	4 bytes

If the dwell off is programmed as position off, the data field will contain the following:

TOTAL # OF SETPOINTS	OFFSET	LIST OF SETPOINTS
(2 bytes)	(2 bytes)	each setpoint is 2 bytes

As with the dwell on, the dwell off can have as many as 4096 different setpoints programmed. If there are more than 110 setpoints programmed, then there is going to be 2 or more response packets. The TOTAL # OF SETPOINTS contains the total number that is in the list. The OFFSET contains the position in the total list that the first setpoint in the packet holds.

If the dwell off is programmed as a timed off, the data field will contain the following:

TIMED VALUE
(2 bytes)

The integer returned will be between 0 and 999. This corresponds to 0.00 - 9.99 seconds.

NOTE: All integer values must be sent low byte first.

11.15: Function 21 (Program)-Enter New Dwell On Setpoint for Requested Limit Number

This function will either enter a setpoint as a dwell off if it is programmed for position off limit or enter the timed value if it is programmed as a timed off limit. The following command is sent:

HEADER	FNC	PRG	LIMIT #	POS/TIMED	SETPOINT/TIME	END OF MESSAGE
8 bytes	0x15	0x01	1-16	0x00 - position 0x01 - timed	Position - 2 byte setpoint Timed - 2 byte time value	4 bytes

The POS/TIMED byte is used to indicate whether a setpoint or a timed value is to follow. This function is not used to change the limit from a position to a timed off or from a timed off to a position. This is accomplished by function 22. If the limit is programmed as a position off and a timed value is sent, or if the limit is programmed as a timed off and a setpoint is sent, error code 12 (0x0C) will be returned in the response packet indicating that function 22 needs to be performed first before the setpoint or timed value can be sent.

The following will be sent back as a response to a valid string:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0x15	0x00	4 bytes

11.16: Function 22 (Inquire)-Inquire Whether Requested Limit Number is Position Off or Timed Off

The following command will send back whether the limit number is programmed as a position off or a timed off:

HEADER	FNC	INQ	LIMIT #	END OF MESSAGE
8 bytes	0x16	0x00	1-16	4 bytes

The following response packet will be returned:

HEADER	FNC	CFM	LIMIT #	POS/TIMED	END OF MESSAGE
8 bytes	0x16	0x00	1-16	0x00 - position 0x01 - timed	4 bytes

11.17: Function 22 (Program)-Change Limit Number from Position to Timed or Timed to Position

If the requested limit number is programmed as a position off, then this function will change it to a timed off. If it is programmed as a timed off, then this function will change it to a position off.

NOTE: Before the limit can be changed from position to timed off, all dwell setpoints must be deleted first. This can be accomplished using functions 25 and 26. If the dwell setpoints are not deleted, error code 14 (0x0E) will be sent in the response packet. When switching from a position to a time, the timed value needs to be entered through function 21 (program).

The following command is sent to change limit:

HEADER	FNC	PRG	LIMIT #	POS/TIMED	END OF MESSAGE
8 bytes	0x16	0x01	1-16	0x00 - change to position off 0x01 - change to timed off	4 bytes

The following response packet will be returned:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0x16	0x00	4 bytes

11.18: Function 23 (Program)-Change Dwell On Setpoint for Requested Limit Number

This function will change a current dwell on setpoint to a new dwell on setpoint. The following message packet is sent to the Press-Set in order to make the change:

HEADER	FNC	PRG	LIMIT #	OLD SETPOINT	NEW SETPOINT	END OF MESSAGE
8 bytes	0x17	0x01	1-16	(2 bytes)	(2 bytes)	4 bytes

NOTE: Setpoints are integer values and should be sent low byte first.

The following response packet will be returned:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0x17	0x00	4 bytes

11.19: Function 24 (Program)-Change Dwell Off Setpoint for Requested Limit Number

This function will change a current dwell off setpoint to a new dwell off setpoint. The following message packet is sent to the Press-Set:

HEADER	FNC	PRG	LIMIT #	OLD SETPOINT	NEW SETPOINT	END OF MESSAGE
8 bytes	0x18	0x01	1-16	(2 bytes)	(2 bytes)	4 bytes

NOTE: Setpoints are integer values and should be sent low byte first.

The following response packet will be returned:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0x18	0x00	4 bytes

11.20: Function 25 (Program)-Clear Dwell On Setpoint for Requested Limit Number

This function allows the deletion of a dwell on setpoint for the requested limit. The following message packet is sent to the Press-Set.

HEADER	FNC	PRG	LIMIT #	SETPOINT	END OF MESSAGE
8 bytes	0x19	0x01	1-16	(2 bytes)	4 bytes

NOTE: The setpoint is an integer value and should be sent low byte first.

The following response packet will be sent back:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0x19	0x00	4 bytes

11.21: Function 26 (Program)-Clear Dwell Off Setpoint for Requested Limit Number

This function allows the detection of a dwell off setpoint for the requested limit. The following message packet is sent to the Press-Set:

HEADER	FNC	PRG	LIMIT #	SETPOINT	END OF MESSAGE
8 bytes	0x1A	0x01	1-16	(2 bytes)	4 bytes

NOTE: The setpoint is an integer value and should be sent low byte first.

The following response packet will be sent back:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0x1A	0x00	4 bytes

11.22: Function 30 (Inquire)-Inquire On Die Protection Parameters

This function will send back the following die protection parameters for the requested die number.

1. The dwell on value
2. The dwell off value
3. The sensor type - normally open (NO) or normally closed (NC)
4. The relay that will fire if a die fault occurs - ESTOP or AUX
5. The die operation - momentary, maintain, or part rev constant monitor
6. The slug out count

The following message packet is sent to the Press-Set:

HEADER	FNC	INQ	DIE #	END OF MESSAGE
8 bytes	0x1E	0x00	(1byte) 1-2	4 bytes

The following response packet will be sent:

HEADER
8 bytes

FNC	CFM	DIE #	DWELL ON	DWELL OFF	SENSOR	RELAY
0x1E	0x00	(1 byte) 1-12	(2 bytes)	(2 bytes)	0x00 - NO 0x01 - NC	0x00 - ESTOP 0x01 - AUX

OPERATION 1	OPERATION 2
1 byte 0x00 - MOMENTARY 0x01 - MAINTAIN	1 byte 0x00 - OPERATION 1 0x01 - PART REV CONST MON

SLUG OUT COUNT	END OF MESSAGE
(1 byte) 1-9	4 bytes

NOTE: The dwell on and dwell off values are integers and will be sent back low byte first.

If either the DWELL ON or DWELL OFF values have not been programmed, the value returned will be a 0xFFFF.

11.23: Function 30 (Program)-Enter Die Protection Parameters for Requested Die Number

This function will allow the user to program all six of the parameters for the die protection. The six items that can be programmed are as follows:

1. The dwell on value
2. The dwell off value
3. The sensor input: NO - Normally Open NC - Normally Closed
4. The relay to fire (ESTOP or AUX)
5. The die operation - momentary, maintain, or part rev constant monitor
6. The slug out count

The following message packet is sent to the Press-Set:

HEADER
8 bytes

FNC	PRG	DIE #	DWELL ON	DWELL OFF	SENSOR	RELAY
0x1E	0x01	(1 byte) 1-12	2 bytes	2 bytes	1 byte 0x00 - NO 0x01 - NC	1 byte 0x00 - ESTOP 0x01 - AUX

OPERATION 1	OPERATION 2
1 byte 0x00 - MOMENTARY 0x01 - MAINTAIN	1 byte 0x00 - OPERATION 1 0x01 - PART REV CONST MON

SLUG OUT COUNT	END OF MESSAGE
(1 byte) 1-9	4 bytes

NOTE: The dwell on and dwell off values are integers and will be sent back low byte first.

In order to remove a die protection, the dwell on and the dwell off value must be both set to zero. This is the only time a die on value can equal a die off value.

The following response packet will be sent back:

HEADER	FNC	INQ	DIE #	END OF MESSAGE
8 bytes	0x1E	0x00	(1byte) 1-2	4 bytes

11.24: Function 40 (Inquire)-Retrieve Current Stroke Counter Value

This function will send back the current stroke counter value. The following message packet is sent to the Press-Set:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x28	0x00	4 bytes

The following response will be sent back:

HEADER	FNC	CFM	STROKE COUNTER	END OF MESSAGE
8 bytes	0x28	0x00	(4 byte value)	4 bytes

NOTE: The stroke counter value is a long integer and will be sent out lowest byte first and highest byte last.

11.25: Function 40 (Program)-Clear Stroke Counter

This function will allow the user to set the stroke counter back to zero. The following message packet is sent to the Press-Set:

HEADER	FNC	PRG	END OF MESSAGE
8 bytes	0x28	0x01	4 bytes

The following response message will be sent back:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0x28	0x00	4 bytes

11.26: Function 41 (Inquire)-Retrieve Current Actual Batch Counter Value

This function will send back the actual batch counter value. The following message packet is sent to the Press-Set:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x29	0x00	4 bytes

The following message will be sent back:

HEADER	FNC	CFM	COUNTER ENA-DIS	ACTUAL BATCH COUNTER	END OF MESSAGE
8 bytes	0x29	0x00	0x00 - Counter Disabled 0x01 - Counter Enabled	(4 byte value)	4 bytes

NOTE: The actual batch counter is a long integer and is sent out lowest byte first and highest byte last.

Since the batch and total counters can be disabled, the COUNTER ENA/DIS byte will indicate whether they are enabled or disabled. This value can be changed using function 76.

11.27: Function 41 (Program)-Clear Actual Batch Counter

This function will allow the user to set the actual batch counter back to zero. The following message packet is sent to the Press-Set:

HEADER	FNC	PRG	END OF MESSAGE
8 bytes	0x29	0x01	4 bytes

The following response will be sent back:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0x29	0x00	4 bytes

11.28: Function 42 (Inquire)-Retrieve Actual Total Counter Value

This function will send back the actual total counter value. The following message packet is sent to the Press-Set:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x2A	0x00	4 bytes

The following response will be sent back:

HEADER	FNC	CFM	COUNTER ENA-DIS	ACTUAL TOTAL COUNTER	END OF MESSAGE
8 bytes	0x2A	0x00	0x00 - Counter Disabled 0x01 - Counter Enabled	(4 byte value)	4 bytes

NOTE: The actual total counter value is a long integer and is sent out lowest byte first and highest byte last.

Since the batch and total counters can be disabled, the COUNTER ENA/DIS byte will indicate whether they are enabled or disabled. This value can be changed using function 76.

11.29: Function 42 (Program)-Clear Actual Total Counter

This function will allow the user to set the actual total counter back to zero. The following message packet is sent to the Press-Set:

HEADER	FNC	PRG	END OF MESSAGE
8 bytes	0x2A	0x01	4 bytes

The following response will be sent back:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0x2A	0x00	4 bytes

11.30: Function 43 (Inquire)-Retrieve Programmed Batch Counter Value

This function will send back the programmed batch counter value. The following message packet is sent to the Press-Set:

HEADER	FNC	INC	END OF MESSAGE
8 bytes	0x2B	0x00	4 bytes

The following response will be sent back:

HEADER	FNC	CFM	PROGRAMMED BATCH COUNTER VALUE	END OF MESSAGE
8 bytes	0x2B	0x00	(4 byte value)	4 bytes

NOTE: The programmed batch counter value is a long integer and is sent out lowest byte first and highest byte last.

11.31: Function 43 (Program)-Change the Programmed Batch Counter Value

This function will allow the user to change the programmed batch counter value. The following message packet is sent to the Press-Set:

HEADER	FNC	PRG	PROGRAMMED BATCH COUNTER VALUE	END OF MESSAGE
8 bytes	0x2B	0x01	0 - 999999 (4 bytes)	4 bytes

NOTE: The programmed batch counter value is a long integer and should be sent lowest byte first and highest byte last.

The following response will be sent back:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0x2B	0x00	4 bytes

11.32: Function 44 (Inquire)-Retrieve Programmed Total Counter Value

This function will send back the programmed total counter value. The following message packet is sent to the Press-Set:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x2C	0x00	4 bytes

The following response will be sent back:

HEADER	FNC	CFM	PROGRAMMED BATCH COUNTER VALUE	END OF MESSAGE
8 bytes	0x2C	0x00	(4 byte value)	4 bytes

NOTE: The programmed total counter value is a long integer and is sent out lowest byte first and highest byte last.

11.33: Function 44 (Program)-Change the Programmed Total Counter Value

This function will allow the user to change the programmed total counter value. The following message packet is sent to the Press-Set:

HEADER	FNC	PRG	PROGRAMMED BATCH COUNTER VALUE	END OF MESSAGE
8 bytes	0x2C	0x01	0 - 999999 (4 bytes)	4 bytes

NOTE: The programmed total counter value is a long integer and must be sent out lowest byte first and highest byte last.

The following response packet will be sent back:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0x2C	0x00	4 bytes

11.34: Function 50 (Inquire)-Retrieve the Current Decimal Point Setting

This function will send back the current decimal point position. The following message packet is sent to the Press-Set:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x32	0x00	4 bytes

The following response packet is sent back from the Press-Set:

HEADER	FNC	CFM	DECIMAL POINT SETTING	END OF MESSAGE
8 bytes	0x32	0x00	0x00 - None 0x01 - Tenths 0x02 - Hundreths 0x03 - Thousandths	4 bytes

11.35: Function 50 (Program)-Change Decimal Point Setting

This function will change the current decimal point position. The following is sent to the Press-Set:

HEADER	FNC	PRG	DECIMAL POINT SETTING	END OF MESSAGE
8 bytes	0x32	0x01	0x00 - None 0x01 - Tenths 0x02 - Hundreths 0x03 - Thousandths	4 bytes

The following response packet will be sent back:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0x32	0x00	4 bytes

11.36: Function 60 (Inquire)-PCA Limits & Programmed Values

This function will send back the PCA limits and the values that are programmed for it. The following message packet is sent to the Press-Set:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x32	0x00	4 bytes

The following response packet will be sent back:

HEADER
8 bytes

FNC	CFM	# OF LIMITS	PCA LIMIT #	PCA VALUE	END OF MESSAGE
0x3C	0x00	(1 byte) 0 - 4	(2 bytes) 1 - 16	(2 bytes) 0 - 9	4 bytes

NOTE: The PCA limit and PCA value are sent LSB first.

11.37: Function 60 (Program)-PCA Limits & Programmed Values

In order to enter a new PCA limit and value, or remove an existing PCA limit, the following message packet is sent to the Press-Set:

HEADER	FNC	PRG	PCA LIMIT #	PCA VALUE	END OF MESSAGE
8 bytes	0x3C	0x01	(2 bytes) 1 - 16	(2 bytes) 0 - 9	4 bytes

NOTE: A PCA value of zero will result in the removal of the PCA limit. The PCA limit and PCA value need to be sent LSB first.

The following response packet will be sent back:

HEADER	FNC	CMF	END OF MESSAGE
8 bytes	0x3C	0x00	4 bytes

11.38: Function 62 (Inquire)-Constant Monitor Setting

This function will send back the current settings for all three constant monitors. The following message packet is sent to the Press-Set:

HEADER	FNC	CMF	END OF MESSAGE
8 bytes	0x3E	0x00	4 bytes

The following will be sent back from the Press-Set:

HEADER	FNC	CMF	CON MON 1	CON MON 2	CON MON 3	END OF MESSAGE
8 bytes	0x3E	0x00	1 byte 0x00 - AUX 0x01 - ESTOP	1 byte 0x00 - AUX 0x01 - ESTOP	1 byte 0x00 - AUX 0x01 - ESTOP	4 bytes

11.39: Function 71 (Inquire)-Read Software Revision

This function will send back the software revision of the Press-Set. The following message packet is sent to the Press-Set:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x47	0x00	4 bytes

The following response packet will be sent back from the Press-Set:

HEADER	FNC	CMF	SOFTWARE REVISION	END OF MESSAGE
8 bytes	0x47	0x00	10 byte ASCII string	4 bytes

The software revision will be sent back in a 10 byte ASCII string. An example would be "PS01R2.001".

11.40: Function 72 (Inquire)-Read the Current Scale Factor

This function will send back the current scale factor setting. The following message packet is sent to the Press-Set:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x48	0x00	4 bytes

The following will be sent back from the Press-Set:

HEADER	FNC	CMF	SCALE FACTOR	END OF MESSAGE
8 bytes	0x48	0x00	(2 bytes) 0 -9999	4 bytes

NOTE: The scale factor is an integer value and will be sent low byte first.

11.41: Function 73 (Inquire)-Retrieve Key Position to Clear Die Faults

This function will send back whether the key has to be positioned in only program or in either run or program to clear a die fault condition. The following message packet is sent to the Press-Set:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x49	0x00	4 bytes

The following will be sent back:

HEADER	FNC	CFM	KEY POSITION TO CLEAR DIE FAULT	END OF MESSAGE
8 bytes	0x49	0x00	0x00 - Program only 0x01 - Run or program	4 bytes

11.42: Function 73 (Program)-Clear Die Fault

This function will program if a die fault can be cleared in both the run and program mode or only in the program mode. The following message packet is sent to the Press-Set:

HEADER	FNC	PRG	KEY POSITION TO CLEAR DIE FAULT	END OF MESSAGE
8 bytes	0x49	0x01	0x00 - Program only 0x01 - Run or program	4 bytes

The following response packet will be sent back:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0x49	0x00	4 bytes

11.43: Function 74 (Inquire)-Read Speed Window Parameters

This function will send back the speed window parameters. The following message packet is sent to the Press-Set:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x4A	0x00	4 bytes

The following response packet will be sent back:

HEADER
8 bytes

FNC	CFM	ENA/DIS	WINDOW MIN	WINDOW MAX	END OF MESSAGE
0x4A	0x00	0x00 - Disabled 0x01 - Enabled	(2 bytes) This field is sent only if windows are enabled.	(2 bytes) This field is sent only if windows are enabled.	4 bytes

NOTE: The window minimum and maximum are two byte integers and are sent out low byte first.

If the windows are currently disabled, the minimum setting and the maximum setting are not sent in the response packet. If the windows are enabled, the minimum and maximum settings are sent.

11.44: Function 74 (Program)-Program Speed Window Parameters

This function will allow the user to enable or disable the speed windows and set the minimum and maximum window settings. The following message packet is sent to the Press-Set if the windows are to be enabled:

HEADER	FNC	PRG	ENA	WINDOW MIN	WINDOW MAX	END OF MESSAGE
8 bytes	0x4A	0x01	0x01	(2 bytes) 0 - 1000	(2 bytes) 0 - 1000	4 bytes

NOTE: The window minimum and maximum settings are integer values and should be sent low byte first.

The following response packet will be sent back:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0x4A	0x00	4 bytes

If the windows are to be disabled, the following message packet is to be sent:

HEADER	FNC	PRG	DIS	END OF MESSAGE
8 bytes	0x4A	0x01	0x00	4 bytes

The Press-Set will disable the windows and send back the same response packet as above.

11.45: Function 75 (Inquire)-State of Digital Outputs

This function will send back whether a true state in the digital outputs is on or off. The following message packet is sent to the Press-Set:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x4B	0x00	4 bytes

The following response packet will be sent back:

HEADER	FNC	CFM	KEY POSITION TO CLEAR DIE FAULT	END OF MESSAGE
8 bytes	0x4B	0x00	0x00 - True output state is off 0x01 - True output state is on	4 bytes

11.46: Function 75 (Program)-Change State of Digital Outputs

This function will program whether the true state for the BCD output is on or off. The following message packet is sent to the Press-Set:

HEADER	FNC	PRG	TRUE DIGITAL OUTPUT STATE	END OF MESSAGE
8 bytes	0x4B	0x01	0x00 - True is off 0x01 - True is on	4 bytes

The following response packet will be sent back:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0x4B	0x00	4 bytes

11.47: Function 76 (Inquire)-Enable/Disable Total and Batch Counters

The Press-Set allows the user to disable the total and batch counters. This function will send back which state the counters are currently in. The following message packet is sent to the Press-Set:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0x4C	0x00	4 bytes

The following response packet will be sent back:

HEADER	FNC	CFM	COUNTER STATE	END OF MESSAGE
8 bytes	0x4C	0x00	0x00 - Disabled 0x01 - Enabled	4 bytes

11.48: Function 76 (Program)-Enable/Disable Total and Batch Counters

This function will either enable or disable the total and batch counters. The following message packet is sent to the Press-Set:

HEADER	FNC	PRG	COUNTER STATE	END OF MESSAGE
8 bytes	0x4C	0x01	0x00 - Disable counters 0x01 - Enable counters	4 bytes

If the user wants to disable the counters, a 0 is sent for the counter state. If the user wants to enable the counters, a 1 is sent for the counter state. The Press-Set will then make sure the batch and total counters have been programmed. If they haven't, an error code 23 (0x17) will be sent back to indicate that these values need to be programmed. This can be done through functions 43 and 44. The following will be returned:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0x4C	0x00	4 bytes

11.49: Function 77 (Inquire)-Retrieve which Die Protect will Reference Batch Counter

The following function will send back the die protection number that is referenced by the batch and total counters. The following message packet is sent to the Press-Set:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x4D	0x00	4 bytes

The following response packet is sent back from the Press-Set:

HEADER	FNC	CFM	DIE # REFERENCED BY BATCH	END OF MESSAGE
8 bytes	0x4D	0x00	1-12 (1byte)	4 bytes

11.50: Function 77 (Program)-Program the Die Number Reference by Batch Counter

The following function will program the die protection number that is referenced by the batch counter. The following message packet is sent to the Press-Set:

HEADER	FNC	PRG	DIE # REFERENCED BY BATCH	END OF MESSAGE
8 bytes	0x4D	0x01	1-12 (1byte)	4 bytes

The following response packet will be sent back:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0x4D	0x00	4 bytes

11.51: Function 78 (Inquire)-Retrieve Relay that will Fire when Batch Count is Reached

This function will send back whether the ESTOP relay or the AUX relay will fire when the batch count is reached. The following message packet is sent to the Press-Set:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x4E	0x00	4 bytes

The following response packet will be sent back:

HEADER	FNC	CFM	BATCH COUNT RELAY	TIME DELAY	END OF MESSAGE
8 bytes	0x4E	0x00	0x00 - ESTOP 0x01 - AUX	0 - 999 (2 bytes) Only if relay is AUX	4 bytes

NOTE: The time delay is an integer value and will be sent low byte first, but only if AUX is selected.

The time delay is in hundreths of a second. For example, if a 200 is sent back, the time delay is 2.00 sec. If a 90 is sent back, the time delay is 0.90 sec.

11.52: Function 78 (Program)-Program Relay that will Fire when Batch Count is Reached

This function will program whether the ESTOP or the AUX relay will fire when the batch count is reached. The following message packet is sent to the Press-Set:

HEADER	FNC	PRG	BATCH COUNT RELAY	TIME DELAY	END OF MESSAGE
8 bytes	0x4E	0x01	0x00 - ESTOP 0x01 - AUX	0 - 999 (2 bytes) Only if relay is AUX	4 bytes

The following response packet will be sent back:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0x4E	0x00	4 bytes

11.53: Function 80 (Inquire)-Retrieve List of Speed Compensated Limits

This function will send back a list of the limits that are programmed to operate with the speed compensation ramp. The following message packet is sent to the Press-Set:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x50	0x00	4 bytes

The following will be sent back from the Press-Set:

HEADER	FNC	CFM	# OF LIMITS	LIST OF LIMITS	END OF MESSAGE
8 bytes	0x50	0x00	0 - 16	Each limit # is 1 byte	4 bytes

11.54: Function 80 (Program)-Add or Delete a Limit from the Speed Compensation List

This function will either add a limit as speed compensated, or remove the speed compensation from the limit. The following message packet is sent to the Press-Set:

HEADER	FNC	PRG	DEL/ADD	LIMIT #	END OF MESSAGE
8 bytes	0x50	0x01	0x00 - DEL 0x01 - ADD	1 - 16	4 bytes

The following response packet will be sent back:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0x50	0x00	4 bytes

11.55: Function 81 (Inquire)-Retrieve the Number of Steps and the Settings of the Speed Compensation Ramp

This function will send back the number of steps of the speed compensation ramp and the offset and SPM settings of each step. The following is sent to the Press-Set:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x51	0x00	4 bytes

The following will be sent back from the Press-Set:

HEADER	FNC	CFM	# OF STEPS	OFFSET OF STEP 1	SPM OF STEP 1
8 bytes	0x51	0x00	0 - 16	0 - Scale Factor (2 bytes)	0 - 1000 (2 bytes)

OFFSET OF STEP 2	SPM OF STEP 2
0 - Scale Factor (2 bytes)	0 - 1000 (2 bytes)

•
•
•

OFFSET OF LAST STEP	SPM OF LAST STEP
0 - Scale Factor (2 bytes)	0 - 1000 (2 bytes)

END OF MESSAGE
4 bytes

NOTE: The SPM and the OFFSET are integer values and are sent out low byte first.

A value of 0xFFFF will be sent out if the offset and SPM have not been programmed yet for a given step.

11.56: Function 81 (Program)-Program the Steps in the Speed Compensation Ramp

This function will program the number of steps and the offset and SPM settings for each step. The following is sent to the Press-Set:

HEADER	FNC	PRG	# OF STEPS	OFFSET OF STEP 1	SPM OF STEP 1
8 bytes	0x51	0x01	0 - 16	0 - Scale Factor (2 bytes)	0 - 1000 (2 bytes)

OFFSET OF STEP 2	SPM OF STEP 2
0 - Scale Factor (2 bytes)	0 - 1000 (2 bytes)

•
•
•

OFFSET OF LAST STEP	SPM OF LAST STEP
0 - Scale Factor (2 bytes)	0 - 1000 (2 bytes)

END OF MESSAGE
4 bytes

NOTE: The offset and SPM values are integers and must be sent low byte first.

The following response packet will be sent back:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0x51	0x00	4 bytes

11.57: Function 83 (Inquire)-Retrieve the SPM Point that will Fire the Motion Detect Relay

This function will send back the SPM value that will cause the motion detect relay to energize. The following message packet is sent to the Press-Set:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x53	0x00	4 bytes

The following response packet will be sent back from the Press-Set:

HEADER	FNC	CFM	SPM VALUE	END OF MESSAGE
8 bytes	0x53	0x00	0 - 999 (2bytes)	4 bytes

NOTE: The SPM value is an integer and will be sent out low byte first.

11.58: Function 84 (Inquire)-Retrieve Which Counter is Displayed on LCD

This function will send back whether the stroke, batch, or total counter is displayed on the LCD. The following message packet is sent to the Press-Set:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x54	0x00	4 bytes

The following response packet will be sent back:

HEADER	FNC	CFM	DISPLAY COUNTER	END OF MESSAGE
8 bytes	0x54	0x00	1 byte 0x00 - Stroke 0x01 - Batch 0x02 - Total 0x03 - Shut Height*	4 bytes

11.59: Function 84 (Program)-Program Which Counter will be Displayed on LCD

This function will change which counter will be displayed on the LCD. The following message packet is sent to the Press-Set:

HEADER	FNC	PRG	DISPLAY COUNTER	END OF MESSAGE
8 bytes	0x54	0x01	1 byte 0x00 - Stroke 0x01 - Batch 0x02 - Total 0x03 - Shut Height*	4 bytes

The following response packet will be sent back:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0x51	0x00	4 bytes

NOTE: If function 169 is set to SPM or PROGRAM NUMBER, GRAY CODE may not be selected. If function 169 is set to COUNTER BALANCE, function 85 may not be programmed.

* Only valid if your Series 1992 has the Ram-Set option.

11.60: Function 85 (Inquire)-Retrieve Digital Output Type

This function will send back whether the digital outputs are in binary coded decimal, natural binary or Gray code. The following message packet is sent to the Press-Set:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x55	0x00	4 bytes

The following response packet will be sent back:

HEADER	FNC	CFM	DIGITAL OUTPUT TYPE	END OF MESSAGE
8 bytes	0x55	0x00	0x00 - Binary 0x01 - BCD 0x02 - Gray Code	4 bytes

11.61: Function 85 (Program)-Program Digital Output Type

This function will program the digital output type as either binary coded decimal (BCD), natural binary, or Gray code. The following message packet is sent to the Press-Set:

HEADER	FNC	PRG	DIGITAL OUTPUT TYPE	END OF MESSAGE
8 bytes	0x55	0x01	0x00 - Binary 0x01 - BCD 0x02 - Gray Code	4 bytes

The following response packet will be sent back:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0x55	0x00	4 bytes

11.62: Function 89 (Inquire)-State of Slug Out Die and Slug Count

This function will send back whether the slug out die feature is enabled or disabled. If it is enabled, the die number and slug count will be sent. The following message packet is sent to the Press-Set:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x59	0x00	4 bytes

The following response packet will be returned:

HEADER	FNC	CFM	SLUG OUT STATE	TOTAL # OF DIES SET TO SLUG OUT
8 bytes	0x59	0x00	1 byte 0x00 - Disabled 0x01 - Enabled	(1 byte) 0 - 12

LIST OF DIE #'S AND SLUG COUNTS	END OF MESSAGE
2 bytes	4 bytes

The LIST OF DIE #'S AND SLUG COUNTS is a list in which the first byte is the die # referenced as a slug out. The second byte is the slug count for that particular die. The number of dies programmed for slug out is given in TOTAL # OF DIES SET TO SLUG OUT.

11.63: Function 89 (Program)-State of Slug Out Die and Slug

This function will program whether the slug out die feature is enabled or disabled. The following message packet is sent to the Press-Set:

HEADER	FNC	PRG	SLUG OUT STATE	END OF MESSAGE
8 bytes	0x59	0x01	1 byte 0x00 - Disabled 0x01 - Enabled	4 bytes

The following response will be sent back:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0x59	0x00	4 bytes

11.64: Function 91 (Program)-Clear all Limit Dwell Information for Current Program

This function will erase all limit dwell information, die protect information and all counter information for the current program that is in the controller. The following message packet is sent to the Press-Set:

HEADER	FNC	PRG	END OF MESSAGE
8 bytes	0x5B	0x01	4 bytes

The following response packet will be sent back:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0x5B	0x00	4 bytes

11.65: Function 95 (Inquire)-Ram-Set Programmed Values

This function will respond with the value of the speed offset latch. The following message packet is sent to the Press-Set:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x5F	0x00	4 bytes

The following response packet will be sent back:

HEADER	FNC	CFM	DISPLAY COUNTER	END OF MESSAGE
8 bytes	0x5F	0x00	1 byte 0x00 - Disabled 0x00 - Enabled	4 bytes

This function will change whether the latch for the speed offset will be enabled or disabled. The following message packet is sent to the Press-Set:

HEADER	FNC	PRG	DISPLAY COUNTER	END OF MESSAGE
8 bytes	0x5F	0x01	1 byte 0x00 - Disabled 0x00 - Enabled	4 bytes

The following response packet will be sent back:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0x5F	0x00	4 bytes

11.66: Function 121 (Inquire)-Ram-Set Programmed Values

This function will send back the Ram-Set values that are programmed. The following message packet is sent to the Press-Set:

HEADER	FNC	INQ	RAM-SET PASSCODE	END OF MESSAGE
8 bytes	0x79	0x00	2 bytes	4 bytes

The Ram-Set PASSCODE is the hexadecimal equivalent to the 4 digit integer value that is programmed through the keypad via Function 120.

NOTE: The passcode needs to be sent low byte first

If the passcode is correct, the following response packet is sent back from the Press-Set:

HEADER	FNC	CFM
8 bytes	0x79	0x00

ENABLE	UNITS	COUNT DIRECTION	UPPER LIMIT	LOWER LIMIT
1 byte 0x00 - Disable 0x01 - Enable	1 byte 0x00 - Inches 0x01 - Millimeters	1 byte 0x00 - Incrementing 0x01 - Decrementing	4 bytes 1-999999	4 bytes 0-999998

SLOW DWELL ON	SLOW DWELL OFF	SLOW DOWN RANGE	DRIFT RANGE
(2 bytes) 1-999	(2 bytes) 1-999	(2 bytes) 0-999	(2 bytes) 0-999

MOVE TIME OUT	DRIVE PAST DELAY	END OF MESSAGE
(2 bytes) 0-999	(2 bytes) 0-999	4 bytes

The returned values do not show decimal place location. For the timed values (Slow Dwell On, Slow Dwell Off, Move Time Out, and Drive Past Delay), the number returned should have two decimal places. For example: If the move time out decimal value is 463, the actual value being used is 4.63 seconds.

For the remaining measurements, the number of decimal places is based upon the units being used. For inches, three decimal places. For millimeters, two decimal places.

11.67: Function 121 (Program)-Ram-Set Programmed Values

This function programs the different paramteres of the Ram-Set. The following message packet is sent to the Press-Set:

HEADER	FNC	PRG	RAM-SET PASSCODE
8 bytes	0x79	0x01	2 bytes

ENABLE	UNITS	COUNT DIRECTION	UPPER LIMIT	LOWER LIMIT
1 byte 0x00 - Disable 0x01 - Enable	1 byte 0x00 - Inches 0x01 - Millimeters	1 byte 0x00 - Incrementing 0x01 - Decrementing	4 bytes 1-999999	4 bytes 0-999998

SLOW DWELL ON	SLOW DWELL OFF	SLOW DOWN RANGE	DRIFT RANGE
(2 bytes) 1-999	(2 bytes) 1-999	(2 bytes) 0-999	(2 bytes) 0-999

MOVE TIME OUT	DRIVE PAST DELAY	END OF MESSAGE
(2 bytes) 0-999	(2 bytes) 0-999	4 bytes

RAM-SET PASSCODE is a hexadecimal equivalent of the 4-digit decimal passcode. For example, if the passcode is in memory as “7245”, the value that should be sent for the Ram-Set passcode is 0x4D 0x1C. Note that the LSB is sent first.

The sent values do not show decimal place location. For the times values (Slow Dwell On, Slow Dwell Off, Move Time Out, and Drive Past Delay), the number sent will be based on two decimal places. For example: If the actual value being used is 4.63 seconds, the move time out decimal value to be sent is 463.

For the remaining measurements, the number of decimal places is based upon the units being used. For inches, three decimal places. For millimeters, two decimal places.

If the passcode is correct, the following response packet will be returned:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0x79	0x00	4 bytes

11.68: Function 122 (Inquire)-Shut Height Programmed Value

This function will send back the current value for the Ram-Set shut height drive to point. The following message packet is sent to the Press-Set:

HEADER	FNC	INQ	RAM-SET PASSCODE	END OF MESSAGE
8 bytes	0x7A	0x00	2 bytes	4 bytes

The RAM-SET PASSCODE is the hexadecimal equivalent to the 4-digit integer value that is programmed through the keypad via Function 120.

NOTE: The passcode needs to be sent low byte first

If the passcode is correct, the following response packet will be returned:

HEADER	FNC	CFM	SHUT HEIGHT VALUE	END OF MESSAGE
8 bytes	0x7A	0x00	4 bytes	4 bytes

The received values do not show decimal place location. The number of decimal places is based upon the units being used. For inches, three decimal places. For millimeters, two decimal places.

11.69: Function 122 (Program)-Shut Height Programmed Value

This function will change the current value for the Ram-Set shut height drive to point. The following message packet is sent to the Press-Set:

HEADER	FNC	PRG	RAM-SET PASSCODE	SHUT HEIGHT VALUE	END OF MESSAGE
8 bytes	0x7A	0x01	2 bytes	4 bytes	4 bytes

The RAM-SET PASSCODE is the hexadecimal equivalent to the 4-digit integer value that is programmed through the keypad via Function 120.

NOTE: The passcode and shut height value need to be sent low byte first

The sent values do not show decimal place location. The number of decimal places is based upon the units being used. For inches, three decimal places. For millimeters, two decimal places.

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0x7A	0x00	4 bytes

11.70: Function 130 (Inquire)-Remote Die Fault Clear

This function will send back whether the remote die fault clear is enabled or disabled. The following message packet is sent to the Press-Set:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x82	0x00	4 bytes

The following response packet will be sent back:

HEADER	FNC	CFM	REMOTE DIE CLEAR	END OF MESSAGE
8 bytes	0x82	0x00	1 byte 0x00 - Disabled 0x01 - Enabled	4 bytes

11.71: Function 130 (Program)-Remote Die Fault Clear

This function will program whether the remote die fault clear is enabled or disabled. The following message packet is sent to the Press-Set:

HEADER	FNC	PRG	REMOTE DIE CLEAR	END OF MESSAGE
8 bytes	0x82	0x01	1 byte 0x00 - Disabled 0x01 - Enabled	4 bytes

The following response packet will be sent back:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0x82	0x00	4 bytes

11.72: Function 140 (Inquire)-Counter Balance Pressure

This function will send back the value which the counter balance pressure is set to. The following message packet is sent to the Press-Set:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x8C	0x00	4 bytes

The following response packet will be sent back:

HEADER	FNC	CFM	COUNTER BAL PRESSURE	END OF MESSAGE
8 bytes	0x8C	0x00	1 byte	4 bytes

If the counter balance pressure is not programmed, value of 0xFF will be returned.

11.73: Function 140 (Program)-Counter Balance Pressure

This function will program the counter balance pressure. The following message packet is sent to the Press-Set:

HEADER	FNC	PRG	COUNTER BAL PRESSURE	END OF MESSAGE
8 bytes	0x8C	0x01	(1 byte) 0-254	4 bytes

The following response packet will be sent back:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x8C	0x00	4 bytes

11.74: Function 141 (Inquire)-Counter Balance Range

This function will send back the value which the counter balance range is set to. The following message packet is sent to the Press-Set:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x8D	0x00	4 bytes

The following response packet will be sent back:

HEADER	FNC	CFM	MINIMUM VALUE	MAXIMUM VALUE	END OF MESSAGE
8 bytes	0x8D	0x00	(1 byte) 0-254	(1 byte) 0-254	4 bytes

If the counter balance range is not programmed, a value of 0xFF will be returned for both the minimum and maximum values.

11.75: Function 141 (Program)-Counter Balance Range

This function will program the counter balance range. The following message packet is sent to the Press-Set:

HEADER	FNC	PRG	MINIMUM VALUE	MAXIMUM VALUE	END OF MESSAGE
8 bytes	0x8D	0x01	(1 byte) 0-254	(1 byte) 0-254	4 bytes

The following response packet will be sent back:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0x8D	0x00	4 bytes

11.76: Function 163 (Inquire)-Retrive LED Display at Power-Up

This function will send back whether the resolver position or the SPM is displayed on the LED when the unit is powered up. The following message packet is sent to the Press-Set:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0xA3	0x00	4 bytes

The following response packet will be sent back:

HEADER	FNC	CFM	LED DISPLAY	END OF MESSAGE
8 bytes	0xA3	0x00	0x00 -Position 0x01 - SPM	4 bytes

11.77: Function 163 (Program)-Program LED Display at Power-Up

This function will program whether the resolver position or the SPM will be displayed on the LED. The following message packet is sent to the Press-Set:

HEADER	FNC	PRG	LED DISPLAY	END OF MESSAGE
8 bytes	0xA3	0x01	0x00 -Position 0x01 - SPM	4 bytes

The following response packet will be sent back:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0x55	0x00	4 bytes

11.78: Function 169 (Inquire)-Retrieve Whether Position or SPM is Sent Out Through Digital Outputs

This function will send back whether the resolver position or the SPM is being sent out of the digital outputs. The following message packet is sent to the Press-Set:

HEADER	FNC	INQ	END OF MESSAGE
8 bytes	0xA9	0x00	4 bytes

The following response packet will be sent back:

HEADER	FNC	CFM	DIGITAL OUTPUT	END OF MESSAGE
8 bytes	0xA9	0x00	1 byte 0x00 - Position 0x01 - SPM 0x02 - Die Hits 0x03 - Counter Bal/Ram-Set 0x04 - Program Number	4 bytes

11.79: Function 169 (Program)-Program Digital Outputs as Position or SPM

This function will program the digital outputs as either position or SPM. The following message packet is sent to the Press-Set:

HEADER	FNC	PRG	DIGITAL OUTPUT	END OF MESSAGE
8 bytes	0xA9	0x01	1 byte 0x00 - Position 0x01 - SPM 0x02 - Die Hits 0x03 - Counter Bal/Ram-Set 0x04 - Program Number	4 bytes

The following response packet will be sent back:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0xA9	0x00	4 bytes

NOTE: If Function 85 is set to Gray, SMP and Program Number may not be selected.

11.80: Function 191 (Program)-Clear All Limit Dwell Information for all Programs

This function will clear all the limit information, all die information, and all counter information for all 200 of the programs in the system. The following message packet is sent to the Press-Set:

HEADER	FNC	PRG	END OF MESSAGE
8 bytes	0xBF	0x01	4 bytes

The following response packet will be sent back:

HEADER	FNC	CFM	END OF MESSAGE
8 bytes	0xBF	0x00	4 bytes

Chapter 12: File Command Communications

12.1: Error Codes for Functions

INQUIRE FUNCTIONS:

Function 20:	Error 3 (0x03)	Limit Error	Limit number not between 1 and 16
	Error 24 (0x18)	Format Error	Limit number not sent
Function 21:	Error 3 (0x03)	Limit Error	Limit number not between 1 and 16
	Error 24 (0x18)	Format Error	Limit number not sent
Function 22:	Error 3 (0x03)	Limit Error	Limit number not between 1 and 16
	Error 24 (0x18)	Format Error	Limit number not sent
Function 30:	Error 2 (0x02)	Die Error	Die number is not between 1 and 12
	Error 24 (0x18)	Format Error	Die number not sent
Function 121:	Error 21 (0x21)	Passcode Error	Invalid passcode was entered in to access the Ram-Set Functions
Function 122:	Error 21 (0x21)	Passcode Error	Invalid passcode was entered in to access the Ram-Set Functions

PROGRAM FUNCTIONS:

Function 1:	Error 4 (0x04)	Data Error	Invalid program number
	Error 24 (0x18)	Format Error	Program number not sent
Function 20:	Error 3 (0x03)	Limit Error	Limit number not between 1 and 16
	Error 10 (0x0A)	Dwell On Error	Dwell sent is greater than scale factor Dwell is already programmed as an off Dwell is already programmed as an on
	Error 24 (0x18)	Format Error	Limit number and/or setpoint not sent
	Error 28 (0x1C)	Motion Error	Resolver cannot be in motion when changing setpoints
Function 21:	Error 3 (0x03)	Limit Error	Limit number not between 1 and 16
	Error 11 (0x0B)	Dwell Off Error	Dwell sent is greater than scale factor Dwell is already programmed as an off Dwell is already programmed as an on

	Error 12 (0x0C)	Pos/Timed Error	Dwell is not programmed as indicated in POS/TIMED byte of command packet
	Error 13 (0x0D)	Timed Error	Timed value is not between 0 and 999
	Error 24 (0x18)	Format Error	Limit number, POS/TIMED byte, and /or setpoint not sent
	Error 28 (0x1C)	Motion Error	Setpoint or timed value cannot be changed while resolver is moving
Function 22:	Error 3 (0x03)	Limit Error	Limit number not between 1 and 16
	Error 12 (0x0C)	Pos/Timed Error	Limit already programmed as indicated in POS/TIMED byte in command packet
	Error 14 (0x0E)	Delete Error	All dwells must be deleted before change can take place
	Error 24 (0x18)	Format Error	Limit number and /or POS/TIMED byte not sent
	Error 28 (0x1C)	Motion Error	Resolver cannot be moving while changing from position to time or time to position
Function 23:	Error 3 (0x03)	Limit Error	Limit number not between 1 and 16
	Error 10 (0x0A)	Dwell On Error	New setpoint is greater than scale factor
	Error 15 (0x0F)	Not Dwell Error	Old setpoint is not in the list
	Error 22 (0x16)	Equal Error	Dwell is already programmed as on Dwell is already programmed as off
	Error 24 (0x18)	Format Error	Not enough data bytes sent
	Error 28 (0x1C)	Motion Error	Resolver cannot be moving while changing setpoints
Function 24:	Error 3 (0x03)	Limit Error	Limit number not between 1 and 16
	Error 11 (0x0B)	Dwell Off Error	New setpoint is greater than scale factor
	Error 12 (0x0C)	Pos/Timed Error	Limit is programmed as timed off
	Error 15 (0x0F)	Not Dwell Error	Old setpoint is not in the list
	Error 22 (0x16)	Equal Error	Dwell is already programmed as on Dwell is already programmed as off
	Error 24 (0x18)	Format Error	Not enough data bytes sent
	Error 28 (0x1C)	Motion Error	Resolver cannot be moving while changing dwell settings

Function 25:	Error 3 (0x03)	Limit Error	Limit number not between 1 and 16
	Error 15 (0x0F)	Not Dwell Error	Dwell is not currently programmed
	Error 24 (0x18)	Format Error	Not enough data bytes sent
	Error 28 (0x1C)	Motion Error	Resolver cannot be moving while changing dwell settings
Function 26:	Error 3 (0x03)	Limit Error	Limit number not between 1 and 16
	Error 12 (0x0C)	Pos/Timed Error	Limit is programmed as timed off
	Error 15 (0x0F)	Not Dwell Error	Dwell is not currently programmed as an off
	Error 24 (0x18)	Format Error	Not enough data bytes sent in command packet
	Error 28 (0x1C)	Motion Error	Resolver cannot be moving while changing dwell settings
Function 30:	Error 2 (0x02)	Die No. Error	Die number is not between 1 and 12
	Error 5 (0x05)	Sensor Error	Sensor byte was not a 0 (Normally Open) or a 1 (Normally Closed)
	Error 6 (0x06)	Die On Error	Dwell On value was invalid
	Error 7 (0x07)	Die Off Error	Dwell Off value was invalid
	Error 8 (0x08)	Relay Error	Relay byte was not a 0 (ESTOP) or 1 (AUX)
	Error 9 (0x09)	Die Equal Error	Die on and Die off values cannot be equal
	Error 24 (0x18)	Format Error	Not enough data bytes were sent
	Error 28 (0x1C)	Motion Error	Resolver cannot be moving while changing setpoints
	Error 29 (0x1D)	Operation Error	Die operation value is invalid
	Error 34 (0x22)	Latch Error	Die Input 12 is used as a latch and cannot be programmed
	Error 35 (0x23)	Count Error	Invalid Count entered
Function 43:	Error 16 (0x10)	Counter Error	Counter value not less than or equal to 999999
	Error 24 (0x18)	Format Error	Not enough data bytes were sent
Function 44:	Error 16 (0x10)	Counter Error	Counter value not less than or equal to 999999
	Error 24 (0x18)	Format Error	Not enough data bytes were sent
Function 50:	Error 4 (0x10)	Data Error	Decimal point setting not between 0 and 3
	Error 24 (0x18)	Format Error	Decimal point setting not sent

Function 60:	Error 3 (0x03)	Limit Error	PCA limit number is not between 1 and 16
	Error 13 (0xD)	Timed Error	Limit is timed off. Cannot be used as PCA
	Error 24 (0x18)	Format Error	Not enough data bytes sent
	Error 32 (0x20)	Max PCA Error	Maximum number of PCA limits are programmed
	Error 35 (0x23)	Count Error	PCA count value not between 0 to 9
Function 73:	Error 4 (0x04)	Data Error	Key position not equal to 0 or 1
	Error 24 (0x18)	Format Error	Key position not sent
Function 74:	Error 4 (0x04)	Data Error	ENA/DIS byte is not a 0 or a 1
	Error 17 (0x11)	Window Error	Minimum value sent is not between 0 and 1000 Maximum value sent is not between 0 and 1000 Minimum value is not less than Maximum value
	Error 24 (0x18)	Format Error	Not enough data bytes were sent
Function 75:	Error 4 (0x04)	Data Error	True output state is not a 0 or a 1
	Error 24 (0x18)	Format Error	True output state was not sent
Function 76:	Error 4 (0x04)	Data Error	Counter state is not a 0 or a 1
	Error 23 (0x17)	Prog. Cntr. Error	Batch and total counters not programmed
	Error 24 (0x18)	Format Error	Counter state byte not sent
Function 77:	Error 2 (0x02)	Die Error	Die number not between 1 and 12
	Error 24 (0x18)	Format Error	Die number not sent
Function 78:	Error 4 (0x04)	Data Error	Relay byte was not a 0 or a 1 Time delay was not between 0 and 999
	Error 24 (0x18)	Format Error	Not enough data bytes sent
Function 80:	Error 3 (0x03)	Limit Error	Limit number not between 1 and 16
	Error 4 (0x04)	Data Error	ADD/DEL byte was not a 0 or a 1
	Error 24 (0x18)	Format Error	Not enough data bytes sent
Function 81:	Error 18 (0x12)	Step Error	Step number is not between 0 and 16
	Error 19 (0x13)	SPM Error	Invalid SPM value
	Error 20 (0x14)	Same SPM Error 2	SPM values cannot be equal
	Error 21 (0x15)	Offset Error	Invalid Offset value
	Error 24 (0x18)	Format Error	Not enough data bytes were sent

Function 84:	Error 4 (0x04)	Data Error	Counter was not equal to 0, 1 or 2
	Error 24 (0x18)	Format Error	Counter byte was not sent
Function 85:	Error 4 (0x04)	Data Error	Digital output type was not equal to 0, 1 or 2
	Error 24 (0x18)	Format Error	Digital output type byte was not sent
	Error 30 (0x1E)	Combination Error	Gray code cannot be selected if SPM or Program number is set in Function 169
	Error 40 (0x28)	Ram-Set Error	Function not valid while Ram-Set/ counter balance set in Function 169
Function 89:	Error 4 (0x04)	Data Error	Slug out state not 0 or 1
	Error 24 (0x18)	Format Error	Not enough data bytes sent
Function 91:	Error 28 (0x1C)	Motion Error	Resolver cannot be moving while deleting dwell settings and die information
Function 121:	Error 4 (0x04)	Data Error	Enable, units, and/or count direction not 0 or 1
	Error 13 (0x0D)	Timed Error	Timed values are not within proper ranges
	Error 21 (0x21)	Passcode Error	Invalid passcode was entered in to access the Ram-Set functions
	Error 24 (0x18)	Format Range	Not enough data bytes sent
	Error 37 (0x25)	Range Error	Slow down and/or drift range is out of given parameters
	Error 38 (0x26)	Shut Height Limit Error	Shut Height upper and/or lower limit is unacceptable
Function 130:	Error 4 (0x04)	Data Error	Remote die clear state not a 0 or 1
	Error 24 (0x18)	Format Error	Not enough data bytes sent
Function 140:	Error 24 (0x18)	Format Error	Not enough data bytes sent
	Error 31 (0x1F)	Invalid CB Range Error	Counter balance setting not between 0-254 or Counter balance range (Func141) not set
Function 141:	Error 24 (0x18)	Format Error	Not enough data bytes sent
	Error 31 (0x1F)	Invalid CB Range Error	Counter balance must be between 0-254. Min value cannot be greater than or equal to max

Function 163:	Error 4 (0x04)	Data Error	LED display byte not equal to 0 or 1
	Error 24 (0x18)	Format Error	LED display byte not sent
Function 169:	Error 4 (0x04)	Data Error	Display counter value must be between 0-5
	Error 24 (0x18)	Format Error	Digital output byte not sent
	Error 30 (0x1E)	Invalid Digital Output Error	Conflict occurring between Function 85 and Function 169
	Error 36 (0x24)	Latch Program Error	Die #12 is now erased of any data and is being used as a latch
Function 191:	Error 28 (0x1C)	Motion Error	Resolver cannot be moving while deleting dwell settings and die information

12.2: Uploading and Downloading using Parameter Files

(Please read the protocol introduction before this section.)

All of the Press-Set parameters are divided into three files: the system file, the program file, and the dwell file. Each file can be uploaded from the Press-Set and downloaded to the Press-Set. In order to distinguish a command packet as an uploading or downloading function, the command byte (CMD) of the header is set to 0x0F.

UPLOADING A FILE

Function 68 is used to upload file information from the Press-Set. The following is the command packet that is sent to upload a file:

DLE	STX	DST	SRC	CMD	STS	TNS
0x10	0x02	xx	xx	0x0F	0x00	xxxx

FNC	PACKET OFFSET	TOTAL TRANS	SYSTEM ADDRESS Flag byte	File #	SIZE
0x68	0x0000	xxxx	0x02	0xXX	xx

DLE	EXT	CRC
0x10	0x03	xxxx

The CMD byte is 0x0F to indicate that this is a file command. The FNC byte is a 0x68 to indicate that it is an upload of a file. The system address will contain the type of file to upload. The first byte of the system address is always a 0x02. The second byte contains the file number. The system file is File #1, the program file is File #2, and the dwell file is File #3. Since the command packet is limited to 255 bytes, the dwell file can only send back 60 dwells in one packet. If there are more dwells programmed, then the dwells will be sent back in multiple packets.

If there is no error in the data, then the following response packet will be sent back.

DLE	STX	DST	SRC	CMD	STS	TNS	TYPE/DATA PARAMETER	FILE DATA
0x10	0x02	xx	xx	0x4F	0x00	xxxx	0x42	up to 240 bytes

DLE	EXT	CRC
0x10	0x03	xxxx

DOWNLOADING A FILE

Function 67 is used to download file information from the Press-Set. The following is the command packet sent to download a file:

DLE	STX	DST	SRC	CMD	STS	TNS
0x10	0x02	xx	xx	0x0F	0x00	xxxx

FNC	PACKET OFFSET	TOTAL TRANS	SYSTEM ADDRESS Flag byte	File #	TYPE DATA PARAMETER	FILE DATA
0x67	0x0000	xxxx	0x02	0xXX	0x42	up to 240 bytes

DLE	EXT	CRC
0x10	0x03	xxxx

TOTAL TRANS refers to the number of bytes sent in the file data.

If there is no error in the data, then the following response packet will be sent back:

DLE	STX	DST	SRC	CMD	STS	TNS
0x10	0x02	xx	xx	0x4F	0x00	xxxx

DLE	EXT	CRC
0x10	0x03	xxxx

12.3: File Descriptions

The three types of parameter files are assigned the following file numbers:

System File: 1
Program File: 2
Dwell File: 3

The **system** file contains the following parameters:

Word	Parameter
0	Scale Factor
1	Decimal point setting
2	Acceptable brake monitor stop time
3	Actual brake monitor stop time
4	Actual brake monitor stop distance
5	Motion detect
6	Digital output
7	Digital output type
8	Digital output state
9	Speed window enabled/disabled
10	Speed window minimum
11	Speed window maximum
12	LED power-up
13	Counter displayed on LCD
14	Key position to clear die faults
15	Current SPM value
16	Current POS value
17	Counter balance minimum pressure
18	Counter balance maximum pressure
19	Remote die fault clear input status
20	State of speed offset latch
21	Number of limits that are speed compensated
	List of limits
	Number of steps in speed compensation ramp
	Step 1 offset
	Step 1 SPM
	Step 2 offset
	Step 2 SPM
	.
	.
	Last step offset
	Last step SPM

The **program** file contains the following parameters:

Word	Parameter
0	Program Number
1	Flag to clear stroke counter
2	Flag to clear batch counter
3	Flag to clear total counter
4-5	Batch counter maximum
6-7	Total counter maximum
8-9	Actual stroke counter
10-11	Actual batch counter
12-13	Actual total counter
14	Enable or disable batch and total counters
15	Batch counter relay - ESTOP or AUX
16	Batch relay time delay
17	Die number that references batch relay
18	Number of die protection
19	Die protect number
20	Die on setting
21	Die off setting
22	Die sensor - N.O. or N.C.
23	Die relay - ESTOP or AUX
	Rest of die protection list

The **dwell** file is set up as follows:

Word	Parameter
0	Limit number and dwell setting
	1 to 16 Limit number dwell off
	-1 to -16 Limit number dwell on
1	Dwell position

All integers (two bytes) are sent out low byte first. Note that the counter settings are long integers (four bytes) and must be sent out lowest byte first.

12.4: Error Handling

The following is the response packet if there is an error. The STS byte of the response packet is set to a 0x0F to indicate an error:

DLE	STX	DST	SRC	CMD	STS	TNS	EXT STS
0x10	0x02	xx	xx	0x4F	0x0F	xxxx	Error Code

DLE	EXT	CRC
0x10	0x03	xxxx

The following are the error codes:

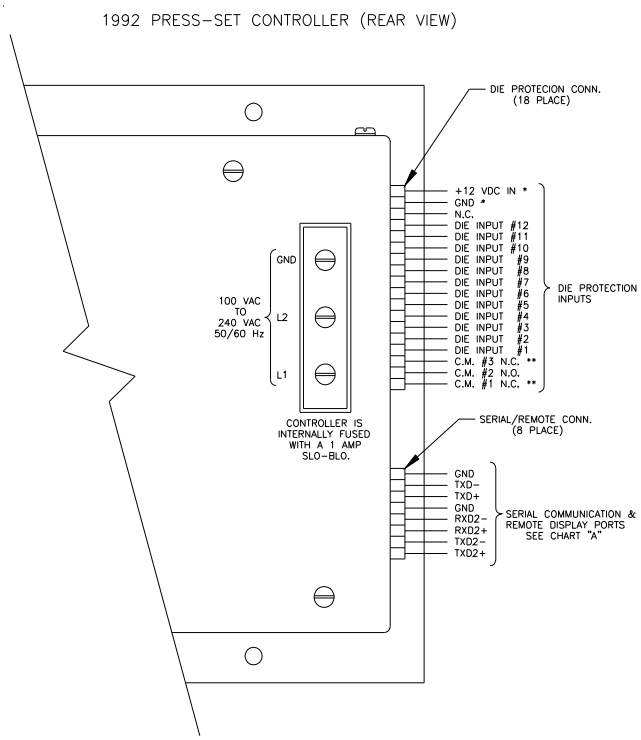
0x06 - Invalid file number. File number must be a 1, 2 or 3.

0x07 - Not enough bytes were sent in data file.

0x0B - Resolver is in motion. Dwells and die information cannot be programmed while the resolver is in motion.

0x12 - Invalid data. When this error is sent back, the integer location of the invalid data in the file is sent in the next two bytes.

Chapter 13: Operating Characteristics



2 WIRE RS485 WITH ROTOCRANK DISPLAY		
TERMINAL No.	**DESIGNATION**	**FUNCTION**
1	TXD2+	RS-485+
2	TXD2-	RS-485-
3	RXD2+	CLOCK + (REMOTE)
4	RXD2-	CLOCK - (REMOTE)
5	GND	N.C.
6	TXD+	SERIAL + (REMOTE)
7	TXD-	SERIAL - (REMOTE)
8	GND	N.C.
2 WIRE RS485 ONLY		
1	TXD2+	RS-485+
2	TXD2-	RS-485-
3	RXD2+	N.C.
4	RXD2-	N.C.
5	GND	N.C.
6	TXD+	N.C.
7	TXD-	N.C.
8	GND	N.C.
4 WIRE RS485 ONLY		
1	TXD2+	RS-485 TRANSMIT +
2	TXD2-	RS-485 TRANSMIT -
3	RXD2+	RS-485 RECEIVE +
4	RXD2-	RS-485 RECEIVE -
5	GND	N.C.
6	TXD+	N.C.
7	TXD-	N.C.
8	GND	N.C.

Appendix A: Troubleshooting

This section describes common electrical problems that may occur after installing the Press-Set. If, after reading this section, you are unable to resolve a problem, contact the factory.

Preliminary Checks

The following are preliminary checks that should be read first before proceeding to following sections in this appendix:

- Is 120 or 240 VAC, depending on the system (see Appendix C: Catalog Number System), supplied to both the controller and output module?
- Are the controller, resolver, output module, and die protection sensors (if sensors are used) properly wired? To confirm this, refer to the general wiring diagram (E0213100) included with the Press-Set as well as Section 2:2 Wiring.
- Are wiring connections at the resolver, output module, and controller terminals securely installed?

Brake Monitor Fault

The brake monitor receives 120 VAC from the press's brake clutch solenoid valve. When the monitor senses a loss in voltage from the brake clutch solenoid valve, a timer within the controller is activated. This timer stops when the brake monitor senses no movement (the press's ram is no longer moving). If the internal timer has a greater time than the programmed time, a brake monitor fault will occur.

- A loss of 120 VAC from the brake clutch solenoid valve, but the resolver (crank) moves more than 5 degrees. This could be caused by a defective press circuit (consult with the press manufacturer for details), or that the brake monitor relay on the output module (IAC24) is defective. To see if this relay is defective, apply a digital voltmeter (set to DC volts) across GND (-) and brake (+) on the relay's output connection on the output module or controller. The digital voltmeter should read approximately 1.2 VDC when 120 VAC is not applied to the brake monitor relay. On the other hand, the meter should read approximately 0 volts when 120 VAC is applied to the brake monitor. If these voltages are not correct, the brake monitor relay is defective.

- A loose wire to the brake input's relay could cause sporadic operation of the relay.
- If the wire connected to the output module for the brake clutch solenoid valve becomes disconnected, or that if this connection was never made. See the following note for more information.

NOTE: If 120 VAC from the press's brake clutch solenoid valve is not supplied to the output module's brake input terminals, the controller will continuously display "NO BRAKE INPUT DETECTED". If you are not using the Press-Set's brake monitor feature, you must continuously supply 120 VAC to the output module's brake monitor inputs to keep the controller from displaying this message.

Resolver Faults

The resolver continuously senses and sends the press's crank position and SPM. If, at any time, the signal being sent to the controller goes out of tolerance, a fault will occur. If your controller is displaying one of the following error messages, go to the message's section and perform the troubleshooting steps provided.

- "PRIMARY SHORTED"
- "PRIMARY OPEN"
- "S1 OPEN"
- "S4 OPEN"

Primary Shorted

The resolver's rotor coil receives a voltage from the controller. This rotor coil then feeds the stator coils, which gives a ratiometric feedback used to calculate position. If the controller displays "PRIMARY SHORTED" the resolver's primary coil may be shorted. Perform the following steps:

1. Confirm that the resolver's wire connections are secure and properly connected.

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ENT

2. With the security keyswitch in Program mode, select the clear key followed by Enter. If the fault clears, proceed with the operation of the press. If the error code does not clear, continue to the next step.

3. With a digital voltmeter set to AC operation, check the voltages between terminals RH and RL on the controller where the resolver connects (red and black of red wires). The voltage level between these two terminals should be between 3.6 and 5.0 VAC. If voltage is at 0, continue to the next step.

4. Remove the wires from terminals RH and RL. With the voltmeter still set to AC, check across terminals RH and RL for voltage. If no voltage is present, the resolver drive circuit has been damaged. Contact factory for further assistance. However, if the voltage level is present, continue to the next step.

5. Set the digital voltmeter to resistance (ohms Ω). With the red and black of red wires removed from the connector, check the circuit resistance across these wires. Normal readings will be approximately 18-50 ohms. If reading is 0 ohms, check the resolver cable for shorts. Remove connector at the resolver and ring out cable. For pin out details, use wiring diagram E0213100. If the cable check proves correct yet 0 resistance is seen when connected to the resolver, it is likely that the resolver rotor coil has been shorted. Contact factory for further assistance.

Primary Open

If the controller displays "PRIMARY OPEN" the resolver's primary coil may be open. Perform steps 1-5 in the Primary Shorted section. When checking the circuit resistance across the wires in step 5, if the reading is higher than 50 ohms, remove the connector at the resolver and check for 0 ohm continuity across both ends of each wire. If the cable check proves correct (normal readings will be approximately 18-50 ohms) yet a high resistance is seen when connected to the resolver, it is likely that the resolver primary coil is open. Contact factory for further assistance.

S1 Open

The stator coils (two total) generate a ratiomentric analog signal output. The outputs are fed into a resolver-to-digital (R/D) converter in the controller where the phase shift relationship of the stator signals are compared and accurately converted to a rotational position. If the controller displays "S1 OPEN", perform the following steps:

1. Confirm that the resolver's wire connections are secure and properly connected.

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2. With the security keyswitch in Program mode, select the clear key followed by Enter. If the fault clears, proceed with the operation of the press. If the error does not clear, continue to the next step.

3. With a digital voltmeter set to AC, check the voltage across terminals S1 and S3 (white and black of white wires). The voltage level should be between 0 and 4.7 VAC, depending on the resolver's position. Slowly rotate the resolver while checking the voltage levels. Within one revolution of the resolver, the voltage should make a cycle from 0 to 5 volts. If no voltage is seen, perform steps 4-7.

4. With the digital voltmeter still set to AC, check terminals RH and RL on the controller to make sure a voltage between 3.6 and 5.0 VAC is present.

5. Remove the green and black of green and the white and black of white wires from the controller and resolver, and check for continuity or shorts.

6. Remove the white and black of white wires from their terminals on the PLS. With the digital voltmeter still set to AC, check the voltage levels across the green and black of green wires and the white and black of white wires. If no voltage is present, the resolver's stator is likely open and will need to be replaced. If voltage is present, reconnect the wires making sure the wires are securely connected.

7. To check for an open or shorted condition inside of the resolver, remove the amphenol-style connector from the resolver and make the following checks at the resolver: Measure the resistance across pins A and B (rotor); it should measure approximately 20 ohms. Measure across pins C and D (stator); it should measure approximately 100 ohms. Measure across pins E and F; it should measure the same as pins C and D.

C/CE
ENT

8. With the security keyswitch in Program mode, select the clear key followed by Enter. If this does not clear the controller's fault message, the R/D circuitry is damaged. Contact factory for further assistance.

S4 Open

If the controller displays "S4 OPEN" perform steps 1-6 in the S1 Open section. In step 7, remove the white and black of white wires on the controller. With the digital voltmeter set to AC, check the voltage levels across the green and black of green wires and the white and black of white wires. If no voltage is present, the resolver's stator is likely open and will need to be replaced. If voltage is present, reconnect the wires making sure the wires are securely connected and perform step 8.

Die Protection Faults

Any fault in the die protection circuitry will cause a die protection fault to occur. The fault will specify the specific faulted input. The following are listings of conditions which can cause die protection faults to occur. These listings are divided into constant monitor faults (two N.C. and one N.O.) and programmable die protection faults (1-12).

NOTE: +12 VDC and GND from the output module or customer supplied +12 VDC must be connected to corresponding inputs on the controller's die protection connector for the die protection inputs to function.

Constant Monitor Inputs

- If the constant monitor inputs (2 N.C., 1 N.O.) change state during machine operation, a fault will occur.
- If the N.C. inputs are not jumpered when they are not in use, a fault will occur.

NOTE: The two N.C. constant monitor inputs must be jumpered to the controller's +12 VDC or GND inputs if they are not used.

Die Protection Inputs

- The input does not change state within the die protection dwell window, a fault will occur.
- The input, when normally open sensor is selected, is closed upon reaching the dwell window, a fault will occur.
- The input, when a normally closed sensor is selected, is open upon reaching the dwell window, a fault will occur.
- Transition in window if die protection input is programmed in partial revolution constant monitor mode (see 7.1: Applications for Die Protection Inputs).
- Exiting window in wrong state when die protection input is programmed in maintain mode (see 7.1: Applications for Die Protection Inputs).

Appendix B: Function Summary Chart

The following chart contains descriptions and function numbers for all functions the Press-Set supports. For further quick reference, you can scroll through all function numbers and their names on the controller. This is done by selecting the function key followed by the arrow key. Continue selecting the arrow key until you find the function number and name you are looking for. The controller can only be programmed when its keyswitch is in program mode. Programmed parameters can only be viewed (not altered) when the controller is in run mode.

Function Number	Function Name*	Description
50	DEFAULT DEC. PT.	This function is used to program the resolution of the resolver's position to be displayed in whole units, tenths, hundreths, or thousandths.
60	SLCT PCA LIMITS	This function is used to program a limit switch to energize only after the press performs a programmed amount of strokes. See Function 61.
61	SET PCA VALUES	This function is used to program the number of strokes that have to occur before a specific limit switch energizes. See Function 60.
62	C.M. SETTINGS	This function is used to program a constant monitor input to control either the auxiliary or E-STOP relay.
71	SOFTWARE VERSION	This function is used to display the controller's current software version number.
72	SCALE FACTOR	This function is used to program the scale factor's resolution which can be from 2 to 9999; the default setting is 360.
73	CLEAR DIE FAULT	Chooses what mode the controller must be in for an operator to clear a die fault; either Run mode or Run and Program modes.
74	SPEED WINDOW	This function is used to enable or disable the controller's speed window function. For more information, see Speed Window in Chapter 4: General Calibration.

Function Number	Function Name*	Description
75	BCD STATE OUTPUT	This function is used to change the D25 port's output to true when high or true when low. The controller is defaulted to produce output that is true when high.
76	ENA/DIS COUNTER	This function is used to enable or disable a batch or total counter.
77	BATCH COUNT INPUT	This function is used to select one of the 12 die protection inputs that will be referenced for batch count operation.
78	BATCH CNTR RELAY	This function is used to select either the E-STOP or auxiliary relay to de-energize when the batch counter's programmed value is met; or to select limit switch 16 to energize when the batch counter's programmed value is met.
79	OFFSET	This function is used to synchronize the controller's position so that the controller corresponds to the position of the ram.
80	SLCT SPEED LIMITS	This function is used to select a limit switch(es) that will be programmed with a speed compensation setting. For more information, see Section 6.1: Speed Compensation.
81	SET SPEED OFFSETS	This function is used to program a speed compensation setting for a limit switch(es). See Function 80.
82	SET BAUD/PARITY	This function is used to set the controller's baud rate and parity for the RS-485 serial communication.
83	MOTION DETECT	This function is used to program a SPM value for the motion detect function. For more information, see Motion Detect in Chapter 4: General Calibration.
84	MAIN DISP. SETUP	This function is used to program the controller to continuously display either the stroke, batch, or total counter.
85	PORT DATA TYPE	This function is used to select binary, BCD, gray code data, or counter balance data from the controller's D25 port.

Function Number	Function Name*	Description
86	SERIAL ADDRESS	This function is used to enter a serial address for RS-485 communicatoins to occur. Each Series 1992 Press-Set must have a unique address between 0 and 255.
87	SERIAL PORT CNFG.	This function is used to select a 2-wire or 4-wire configuration for the RS-485 serial port.
88	ENA/DIS DIE PROT.	This function is used to enable or disable all die protection inputs for a programmed number of strokes (1-99).
89	ENA/DIS SLUG OUT	This function is used to enable or disable a slug out. For more information, see Section 7.4: Slug Outs.
90	CHNG CUR PROG NUM	This function is used to change a program's current number.
91	CLEAR PROGRAM	This function is used to clear all programmed dwell settings for the program that is currently active.
92	INITIALIZE SYSTEM	This function is used to preset all of the controller's calibration settings to factory calibration and deletes all programming that may be on the controller.
93	COPY CUR PROG NUM	This function is used to copy data from one program to another.
94	INCH BYPASS	This function is used to put die protection input #10 in normal mode or inch mode. As a default, this input is in normal mode. For more information, see Bypassing Speed Compensation While in Inch Mode in Section 6.1: Speed Compensation.
95	SPEED OFFSET LTCH	This function is used to enable or disable the speed offset latch function. For more information, see Speed Offset Latch in Section 6.1: Speed Compensation.
130	REMOTE DIE CLEAR	This function is used to enable or disable the remote input to clear a die protection fault.
140	COUNTER BALANCE	This function is used to select a counter balance pressure for the active program.

Function Number	Function Name*	Description
141	COUNTER BAL RANGE	This function is used to program a counterbalance range.
163	DISPLAY POWER-UP	This function is used to program the controller to display either the resolver's position or SPM when the controller is powered up.
169	PORT DATA VALUE	This function is used to select what data value the controller's D25 port will output.
171	DISP. MICRO FAULTS	This function is used to display microprocessor faults. This function is used for debugging.
172	TEST SERIAL COMM.	This function is used to send a test string from the Press-Set to a PC. This message tests the communication line from the Press-Set to the PC.
173	SERIAL COMM. CRC	This function is used to enable or disable the Cyclic Redundancy Check (CRC) function.
174	COM CHANGES	This function is used to program the controller to permit or not permit you to change limit switch settings and die protection settings through communications while the press is running.
300	TIMED DWELL	This function is used to program a time-dwell setting for a limit switch(es). For more information, See Section 6.2: Time-Dwell Limit Switches.
391	CLEAR ALL PROGS.	This function is used to clear all die protection and limit switch settings for all programs on the controller.
555	SELECTIVE LOCKOUT	This function is used to select specific parameters you wish to lock.
556	UNLOCKED SELECTED	This function is used to unlock protected parameters.
557	CHANGE LOCK PSWRD	This function is used to change the current passcode.

Chart B-1 Function Summary

*As it appears on the controller's display

Appendix C: Catalog Numbering System

Figure C-1 explains the catalog numbering system for the Series 1992 Press-Set. The catalog number can be found on the back of the controller. Charts C-1 through C-3 explains part numbers for the resolver, resolver cable assembly, and remote display.

1992 — E — X — 8M - 4A - 4D — 1 — X

Product Group
Press-Set System includes the controller and output module (See Chart C-1 for resolver part number information)

Digital Output
E = Current Sinking
C = Current Sourcing

Software Options
X = None
F = Feeder Only
R = Ram Adjust Only
P = Feeder and Ram Adjust
O = Future Options

Output Relays (16 Maximum)*
M = Mechanical Relay SPDT 10A
A = AC Solid-state Relay 1 Amp 70 - 250 VAC
D = DC Solid-state Relay 2 Amp 5-60 VDC
X = Controller Only

Input Voltage (Output Module)**
1 = 120 VAC 50-60 Hz
2 = 240 VAX 50-60 Hz
X = Controller Only

Enclosure
X = None
4 = NEMA 4
12 = NEMA 12

* Any combination of mechanical, AC solid-state, and /or DC solid-state output relays can be selected, up to a total of 16.

** Controller accepts 80-240 VAC, 50-60 Hz. Output module must be specified with an input voltage.

Figure C - 1 Series 1992 Catalog Number System

Part Number	Description
1980R-102-R-SP-X	2 circuit, NEMA 1 enclosure, right-hand shaft cam/resolver combination unit.
1980R-102-L-SP-X	2 circuit, NEMA 1 enclosure, left-hand shaft cam/resolver combination unit.
1980R-104-R-SP-X	4 circuit, NEMA 1 enclosure, right-hand shaft cam/resolver combination unit.
1980R-104-L-SP-X	4 circuit, NEMA 1 enclosure, left-hand shaft cam/resolver combination unit.
SD0284200	3/4" input shaft, NEMA 4 enclosure, foot-mount resolver.

Chart C-1 Resolver Part Numbers*

Part Number	Description
SD0334200L**	Resolver cable assembly; 15 ft. standard.

Chart C-2 Resolver Cable Assembly Part Number

Part Number	Description
19951446	Remote circular display

Chart C-3 Remote Display Part Number

* For more information on cam/resolver combination units, see Gemco's 1980R Rotating Cam Limit Switches catalog.

** Insert cable length in feet.

Appendix D: Specifications

Scale Factor Range	2-9999
Temperature Range	Operating 32-125°F. Storage 0-150°F.
Operating Speed	1000 SPM
Counters	Stroke, Batch, and Total
Job Set-up Memory	200
Current Sinking	Sprague ULN2803A, 5-50V, 0-200mA, low true (on). Cannot be used to drive TTL circuit.
Current Sourcing	Sprague UDN2981A, 5-50V, 9-200mA, high true (on). Cannot be used to drive TTL circuit.
Controller Input Voltage	80-240 VAC 50-60 Hz
Output Module Input Voltage	120 VAC 50-60 Hz or 230 VAC 50-60 Hz.
Mechanical	Single pole, double throw 10 amp isolated contact, 2ms (pickup), 15ms (dropout).
AC Solid-state Relay	Single pole, N.O., 1 amp (maximum load), 70-250 VAC, zero voltage switching (load voltage range), 3mA at 120 VAC (leakage current), 3.0V RMS or less (on state voltage drop). 1/2 cycle of line voltage maximum + 1ms or less (operate and reset time).
DC Solid-state Relay	Single pole, N.O., 2 amp (maximum load), 5-60 VDC (load voltage range), 2mA maximum (leakage current), 1.5V maximum (surge current), 50mA (minimum operational current), 0.5ms maximum (operate time), 2ms maximum (reset time).
Fail-safe Mechanical Relays	Double pole, double throw (series) 10A.
Controller Dimensions	6.31: (height) x 8.25” (width) x 6.78” (depth)
Output Module Dimensions	13” (height) x 11” (width) x 3.5” (depth)
Resolver Dimensions	5.5” (height) x 8.5” (width)

Glossary

Auxiliary Relay — When wired properly, this relay can be programmed to top stop the press. This relay was designed to prevent damage to the press or die.

Batch Counter — A counter that can be programmed to de-energize either the auxiliary or E-STOP relay or energize limit switch 16 when the counter's value is met.

Brake Monitor — A function used to warn the operator that the press is not stopping within a safe time. This could be due to brake wear.

Constant Monitor Inputs — Located on the side of the controller, the three constant monitor inputs (two N.C. and one N.O.) allow sensors to send signals to the controller to continuously inform the controller of machine operation. These sensors typically monitor for buckles in material being fed into the press or the end of stock.

Controller — The controller is housed in a metal case that was designed to be panel mounted. The controller consists of a mother board (which contains all keypad and display interface components), a CPU board, an input/ output board, and a power supply board.

Counters — The three counters (stroke, batch, and total) are used to increment each time an event occurs, except for the stroke counter which increments each time a stroke occurs. When the programmed value is met, the controller can be programmed to initiate an action.

Die Protection Inputs — Located on the side of the controller, the 12 die protection inputs allow sensors to send signals to the controller to inform the controller of machine operation. The sensors are mainly used to protect dies from damage due to mis-sequence or buildup of material.

Dwell Off — The programmed position at which a relay becomes de-energized.

Dwell On — The programmed position at which a relay becomes energized.

Dwell Window — The range between a limit switch's dwell on and dwell off positions, and the range between a die protection's on and off positions.

E-STOP Relay — When programmed and wired properly, this relay can stop the press immediately when a fault occurs during machine operation. This relay was designed to prevent damage to the press or die.

Fail-safe Relays	Relays (E-STOP, auxiliary, and motion detect) that can stop the press during certain conditions which can cause damage to the press or die.
Initialization	A programming procedure for presetting all of the controller's settings back to factory calibration, as well as, deleting any existing programs on the controller.
Limit Switch	A mechanical, single pole, double throw relay that can be programmed to energize a device (such as a lubricator or feeder) when connected.
Motion Detect	A feature of the Series 1992 which is used to detect a decrease in press speed due possibly to a broken chain. If the press runs below the programmed value, the motion detect relay will de-energize. This will shut the press down. (The relay must be properly programmed and wired in order for this feature to work).
Motion Detect Relay	This relay can be used to detect a broken chain or coupling. If this occurs, the E-STOP relay will de-energize.
Multiple Dwells	Two or more dwell on and/or dwell off positions programmed for a limit switch(es).
N.O.	Normally Open.
N.C.	Normally Closed.
Offset	Setting the position of the press's ram in correlation with the resolver's position. Normally, when the resolver is inputting 0 to the controller, the ram is at its top-most position.
Output Module	A module that consists of 16-channel programmable limit switches, three fail-safe relays, and a brake monitor relay.
Periodic Control Actuation	Also known as PCA, this function is used to energize a limit switch only after a press performs a programmed number of strokes.
Remote Die Clear	A feature of the Series 1992 which is used to allow the operator to reset a die protection fault from a remote area.
Resolver	A synchronous rotary transducer which monitors the press's crank position.

Security Keyswitch — A two-position keyswitch (located on the controller's faceplate) that can prevent a program from being accidentally changed when the keyswitch is in the Run mode. Only when the controller is in Program mode can changes be made to a program.

Scale Factor — The amount of counts the controller displays as the resolver rotates 360 degrees.

Slug Count — The number of strokes you program when programming a die protection input with a slug out. See Slug Outs.

Slug Outs — A feature of the Series 1992 which is used to program a die protection input not to fault out during a programmed number of strokes if an input is not detected. This can be helpful when excess material, punched out from a die, occasionally exits the die only after several strokes. Because the excess material is not sensed leaving the die after each stroke, a fault would occur. This feature prevents this from happening.

Speed Window — A feature of the Series 1992 which is used to warn the operator when the press's SPM has increased or decreased beyond a programmed range.

SPM — Strokes Per Minute. The speed at which the resolver is moving.

Speed Compensation — A function used to automatically adjust limit switch settings to energize earlier (than their programmed settings) to compensate for an increase in the press's speed. This function was designed for devices which mechanically lag behind when the press's speed increases.

Stroke Counter — A counter that counts the number of strokes the press performs.

Time-dwell Limit Switches — Limit switches programmed to energize for a specific time, rather than de-energize at a particular dwell off position.

Total Counter — A counter that can be programmed to de-energize the E-STOP relay when its programmed value is met.

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