

**User  
Manual**

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**WPC 2000 Option 2**

*Lube, Speed, Hydraulic Overload, and Flywheel Brake Control  
Expanded User Inputs*

**1130700**

*Rev. F July 2023*

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PRINTED IN USA

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# Changes for Revision F of the WPC 2000 Option 2 User Manual (1130700)

This revision of the WPC 2000 Option 2 User Manual covers software version 2.00 and higher. This manual also reflects the following associated product versions:

- SmartPAC PRO firmware version 10.40 or higher
- SmartPAC 2 firmware version 16.26 or higher
- WPC 2000 version 6.39 or higher.

The changes include:

- Added SmartPAC PRO screens and functions
- Revised Lube 1 Frequency maximum value to 65535 strokes or 283 minutes on the Press Lubrication Setup screen (Chapter 3 – Setting Option 2 Initialization Parameters)
- Added ACTUATIONS setting for Monitor Switch Count on the Press Lubrication Setup screen (Chapter 3 – Setting Option 2 Initialization Parameters)
- Revised documentation of fault code F160 (Chapter 6 – Troubleshooting)
- Added new fault code F149 (Chapter 6 – Troubleshooting)
- Added new fault code F163 (Chapter 6 – Troubleshooting)



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## HOW TO USE THIS MANUAL

### NOTICE

The Option 2 can be used with the integration of SmartPAC 2 or SmartPAC PRO with WPC 2000. This manual refers to SmartPAC PRO and shows SmartPAC PRO screens. SmartPAC 2 screens are similar and you can use these instructions with either version of SmartPAC, except where noted.

This manual shows you how to install, wire, program, operate, and troubleshoot WPC 2000 Option 2. Option 2 is a WPC 2000 daughter board that provides expanded user inputs and hydraulic overload and flywheel brake control. Lube and speed control are available as options.

Chapter 1 presents an overview of Option 2 standard and optional features and provides Option 2 specifications.

Chapter 2 shows you how to install and wire the Option 2 board and upgrade Option 2 firmware.

Chapter 3 shows you how to make settings for Option 2 functions in SmartPAC PRO Initialization mode.

Chapter 4 shows you how to establish speed settings for each tool in Program mode.

Chapter 5 shows you how to use Option 2 in Run mode. The chapter covers how to calibrate speed settings, adjust speed settings, monitor motor load percentage, and operate the press in “dead motor inch.”

Chapter 6 provides explanations of the Option 2 fault messages that display on your SmartPAC PRO panel and shows you how to correct these faults.

Appendix A provides a setup sheet for Option 2 user inputs on which you can document the stop type and name you have assigned to each input.

Appendix B provides a lube control setup guide that explains by field the lube control settings you can make in Initialization mode.

Wiring diagrams at the end of the manual provide detailed wiring schematics to help you install and wire your Option 2.

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# Chapter 1 – Introduction

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## NOTICE

The Option 2 can be used with the integration of SmartPAC 2 or SmartPAC PRO with WPC 2000. This manual refers to SmartPAC PRO and shows SmartPAC PRO screens. SmartPAC 2 screens are similar and you can use these instructions with either version of SmartPAC, except where noted.

Option 2 is a “daughter” board that can be added to the WPC 2000 Main Processor board in WPC 2000 systems integrated with SmartPAC 2 or SmartPAC PRO. In order to use Option 2 functionality, you must be running at least the following version levels:

- SmartPAC PRO version 10.40 or higher
- SmartPAC 2 version 16.26 or higher
- WPC 2000 version 6.39 or higher.

Option 2 comes with the following standard features:

- Expanded user inputs (up to 24 additional) for monitoring auxiliary press functions
- Hydraulic overload monitoring and control
- Flywheel brake monitoring and control
- Motor current readout with optional current transducer

You can purchase optional lube control firmware that provides the capability to control and monitor one lubrication system and monitor two additional lube systems. Optional speed control firmware enables you to program speeds used on a variable-speed press by operating mode and tool.

## Expanded User Inputs

Option 2 increases the number of user inputs available for connection of auxiliary devices to WPC 2000. User inputs allow you to monitor auxiliary press functions such as oil pressure, conveyors, etc. and provide additional press protection and operator safety.

Up to 7 non-control-reliable inputs and up to 2 pairs of control-reliable, cross-checked inputs are standard on WPC 2000 units. The Option 2 board enables you to connect up to 20 additional non-control-reliable inputs and up to 4 additional control-reliable, cross-checked input pairs to WPC 2000.

Option 2 user inputs, like WPC 2000 standard inputs, are programmed to stop the press whenever connected equipment malfunctions. The type of stop (e.g., top stop, emergency stop, etc.) is determined by the setting programmed for that input.

All inputs are set to E-stop by default except for inputs 21, 30, 36/37, and 38/39, which are set to E-stop/Lockout. You can change default stop-type settings at the SmartPAC PRO control (see *Setting User Input Stop Type and Name*, page 39).

Non-control-reliable user inputs (i.e., inputs 12-31) can be set to Top-stop, Top-stop/Lockout (a new setting), E-stop, E-stop/Lockout, or Unused. Control-reliable input pairs 32/33, 34/35, 36/37, and 38/39 can be set to E-stop or E-stop/ Lockout. A setup sheet on which you can document stop type assignments for user inputs is provided in Appendix A, page 87.

The new Top-stop/Lockout setting is also an option for WPC 2000 standard inputs 1-7 on units with newer versions of code.

When any equipment connected via Option 2 user inputs to WPC 2000 issues a stop command by opening a normally closed (N/C) input, WPC 2000 signals the press to perform the stop type programmed for that input and displays the input's fault code on the SmartPAC PRO display (see Table 6-1, page 78 for a list of the fault codes assigned to Option 2 user inputs).

When a stop command is issued for any inputs programmed as E-stop/Lockout or Top-stop/ Lockout, the lockout relay also opens, causing "Loc" to appear on the display. The "Loc" message must be cleared (by turning the Stroke Select key switch to OFF, then to INCH) before the press can be restarted.

User inputs 12 through 21 have an input type of NPN. User inputs 22 through 31 and all cross-checked input pairs are PNP.

Instructions for wiring user inputs are provided starting on page 28. Procedures for setting user input stop type and name begin on page 39, and you can learn how to view user input status starting on page 42. User input faults are documented beginning on page 78.

## Hydraulic Overload Control

This standard Option 2 feature provides the capability of monitoring the state of a press equipped with a hydraulic overload system, emergency-stopping the press when a hydraulic overload occurs and providing the logic necessary to repressurize the hydraulic overload system when the overload condition has been cleared.

Option 2 monitors the normally closed pressure switch on the hydraulic overload system and, whenever the switch opens, signals a hydraulic overload fault. As long as the pressure switch is open, Option 2 prevents the press from being re-started. To clear the fault condition and restart the press, the operator must place the press in Inch mode and "inch" the ram to the top of its stroke.

The direction in which the press should be inched to Top Dead Center (TDC) depends on the crankshaft angle at which the press has been emergency-stopped. If the press is e-stopped at or after Bottom Dead Center (BDC), the operator should inch the press in a forward direction. If the press is e-stopped before BDC, the operator should reverse the motor and inch the press to TDC in a reverse direction. (If the press motor cannot be reversed at the control, an electrician may have to change wiring at the motor.) Error messages that display on the SmartPAC PRO console guide the operator in returning the press to TDC in the correct direction.

Option 2 looks for the return of the ram to TDC between crankshaft angles 270° and 30°. When Option 2 sees the ram within this window, the hydraulic overload pump is restarted and the hydraulic overload system repressurized.

Wiring instructions for hydraulic overload inputs and outputs are provided starting on page 31. Hydraulic overload faults are documented beginning on page 79.

## Flywheel Brake Control

This standard feature allows you to monitor and control the operation of a flywheel brake on presses equipped with this device.

- When the main motor is turned ON, the Option 2 turns ON its relay to release the brake. This is also when the Option 2 checks that the input, #467 on TB603, turns ON.
- When the main motor is turned OFF, the Option 2 turns OFF its output.

Flywheel brake control is implemented via an output relay with a normally open (N/O) and a normally closed (N/C) set of contacts. In most cases, the N/O contacts will be used, and closing the contacts will release the flywheel brake.

Monitoring of the flywheel brake is accomplished via an input that senses the state of a pressure or limit switch, which indicates whether the flywheel brake has been released. The type of switch (i.e., pressure or limit) used to monitor the flywheel brake is specified in Initialization mode.

Whenever the main motor is turned on, Option 2 monitors the limit or pressure switch associated with the flywheel brake to make sure the brake is released and, if the brake is applied, stops the main motor by opening the lockout relay on the DSV/Lockout Relay daughter board on the WPC 2000 Main Processor board. A fault message is displayed on the SmartPAC PRO console.

Whenever the main motor is turned off, Option 2 turns on an output to engage the brake and bring the flywheel to a stop.

Flywheel brake monitoring can be disabled, using an Initialization mode setting. When this setting is selected, there is no need to wire a switch to Option 2, and Option 2, therefore, does not know the flywheel brake position. However, the flywheel brake output can still be activated and the flywheel brake controlled.

If your Option 2 has the speed control feature and your motor drive has a tachometer feedback output, you can program the flywheel brake so that it is applied whenever the operator changes the operating mode of the press to one with a slower speed (e.g., from Continuous to Single-stroke, or from Single-stroke to Inch). This feature is enabled in Initialization mode by selecting a “pulsed” brake action. You can also specify the length of the pulse. When the “Pulsed” setting is selected, the flywheel brake is applied in pulses, with a 1-second interval between pulses, whenever press speed changes. The brake is not pulsed when the main motor is turned off.

If you have speed control and your motor drive has tachometer feedback, you can also use Option 2’s “Holding” feature, which applies the flywheel brake only when the flywheel has come to a stop. This feature is also called a parking brake.

If you enable the Dead Motor Inch option in Initialization, the flywheel brake is not applied when the motor is turned off with the Stroke Select key switch in the INCH position. This option allows the press to continue stroking after the main motor has been turned off as long as the operator presses the Run/Inch button(s) while the flywheel is still turning. Once the flywheel stops turning, the flywheel brake is applied.

Wiring connections for flywheel brake inputs and outputs are provided starting on page 32. Settings you can make in Initialization mode are documented starting on page 46. Directions for using the Dead Motor Inch feature in Run mode are given beginning on page 74. Flywheel brake fault messages are documented starting on page 82.

## Other Standard Features

### Motor Current Readout

This standard Option 2 feature allows you to monitor the maximum and minimum percent of load on the press motor during each stroke. In order to supply Option 2 with motor current readings, you must install a self-powered motor current transducer with a 0-10 VDC output on one of the conductors feeding your AC motor.

To enable the current drawn by your motor to be scaled to transducer output and displayed as percent of motor load in SmartPAC PRO, you must specify in Initialization mode the rated amperage of your motor and the high value in the output range of the motor current transducer.

Instructions for installing and wiring a motor current transducer are provided starting on page 35. Initialization settings are covered beginning on page 47. Help with viewing and interpreting the motor current readout in Run mode is given starting on page 72.

### Top-Stop Output Relay for Auxiliary Devices

This standard Option 2 feature provides an extra set of dry contacts that can be set to follow the SmartPAC PRO/WPC 2000 Top-stop string. If you correctly wire a piece of auxiliary equipment to the Option 2 board and select the Top-Stop setting in SmartPAC PRO Initialization, Option 2 will send a 1-second top-stop signal to the auxiliary device whenever the Top-Stop button on the operator station is pressed or the Top-stop string is opened.

The top-stop output relay contacts are normally open (N/O) but held closed. When a Top-Stop command is issued, the contacts open for 1 second.

Top-stop output wiring instructions are provided starting on page 32. Directions for enabling the Top-stop function in Initialization mode are given on page 47

### Dual Safety Valve (DSV) Reset

If you do not use the Option 2 Top-Stop feature, the same set of dry contacts can be used to send a 300 ms pulse to reset a Dual Safety Valve (DSV) whenever the valve is faulted.

Instructions for wiring a DSV are provided starting on page 32. Directions for enabling the DSV Reset function in Initialization mode are given on page 47. To reset a DSV fault, refer to page 60. The DSV fault message is documented on page 82.

## Lube Control

If your Option 2 firmware has the lube control feature, you can control, program and monitor one lubrication system and program and monitor up to two additional lubrication systems.

### Lube 1

The Lube 1 function is designed for lubrication systems that must dispense an initial coating of lubricant to press components, such as the counterbalance cylinders, that require a controlled amount of lubrication before the press begins to operate.

Lube 1 controls operation of a lube control valve or other device during both an initial lube session that occurs before the press is engaged and periodic lube sessions that are initiated after clutch

engagement. You can specify how long the pump or other device should run during both the initial and regular lube sessions. You can also program an interval between regular lubrication sessions (i.e., the time after the pump or other device turns off and before it turns back on). The first regular lubrication session is initiated by engagement of the clutch and begins after the interval you have programmed elapses.

Lube 1 can also monitor operation of the cycle switch on the divider valve that dispenses lubricant to the system. You can program the number of cycle switch actuations that must occur during the initial lube session and each regular lube session to prevent a lube fault. If the specified number of cycle switch actuations does not occur during that time, Option 2 signals a lube fault, top-stopping the press, placing the press in a lockout condition, and displaying a lube fault message on the SmartPAC PRO panel.

## Monitor 1 and 2

Monitor 1 and Monitor 2 are designed for lube systems, such as those that lubricate main bearings, gibs, etc., that operate continuously once a programmed device (e.g., main motor, Dual Safety Valve, or lube pump) is actuated. These Option 2 functions do not control operation of a lube control valve or other device and are used only to monitor operation of the cycle switches on the divider valves that dispense lubricant.

Monitor 1 and 2 allow you to program a monitoring window within which at least one cycle switch actuation must occur to prevent a lube fault. If a cycle switch actuation does not occur within the specified time, Option 2 signals a lube fault, top-stopping the press, placing the press in lockout mode, and displaying a lube fault message on the SmartPAC PRO panel.

Monitor 1 and Monitor 2 lubrication sessions are initiated by the actuation of one of three devices, which you must select when programming either of these lube functions:

- Main motor
- Dual Safety Valve (DSV)
- Lube pump wired to pin #469 (LUBE PUMP ON) on the Option 2 board

You can also program a delay into Monitor 1 and Monitor 2 so that these systems do not begin to look for a cycle switch actuation until a specified amount of time has passed after startup of the programmed device.

Lube control wiring instructions are provided starting on page 32. Initialization settings are covered beginning on page 48. Lube faults are document starting on page 83.

## Speed Control

When configured with the optional speed control feature and installed on a variable speed press equipped with an eddy current or frequency drive, Option 2 allows you to program speed settings for each tool and operating mode. When a tool is loaded, the speed of the press changes automatically to the programmed setting whenever the Stroke Select key switch is turned to a different mode (i.e., from Inch to Single-stroke, from Single-stroke to Continuous, etc.).

To be compatible with Option 2, the motor drive must have a 0-10 VDC velocity input. A 0-10 VDC or 4-20 mA tachometer generator output is optional.

The Option 2 speed control feature allows you to set a different speed for each operating mode (i.e., Continuous, Single-stroke, and Inch) and establish a different set of operating speeds for each tool. You make these settings in SmartPAC PRO Program mode. When the tool is loaded, the preset speeds are automatically loaded with it.

Maximum operating speeds for each mode can be set in SmartPAC PRO Initialization as can maximum and minimum speed limits for press operation in any mode. The maximum speed value is used to scale the speed range to the 0-10 VDC velocity input. If, for example, the maximum speed is set at 200 Strokes per Minute (SPM) and the press is run at 100 SPM, Option 2 outputs a 5 VDC velocity signal to the motor drive.

The minimum press speed setting allows a supervisor to prevent operators from running the press at a slower speed than the minimum specified by the press manufacturer. Running the press at or above this speed ensures that the flywheel has enough energy to deliver sufficient tonnage.

Adjustments to the speeds set in Program mode can be made in Run mode.

Option 2 has a 0-10 VDC or 4-20 mA analog input that, when wired to the 0-10 VDC or 4-20 mA tachometer generator output of the motor drive, supplies the actual flywheel speed to the Press Control Run screen when the press is not engaged.

Wiring instructions for speed control inputs and outputs are provided starting on page 34. Directions for setting speed control initialization parameters are given beginning on page 58. Programming speed control settings by tool is covered starting on page 63, and calibrating and adjusting press speeds in Run mode is documented starting on page 67. Speed control faults are covered on page 85.

## Specifications

Option 2 specifications are shown in Table 1-1.

*Table 1-1. Option 2 Specifications*

User inputs (digital)	24 VDC @ 8 mA maximum
Analog inputs	12 VDC maximum
Analog output	10 VDC maximum, 10KO load minimum
Relay outputs	Dry contact, 250 VAC or 24 VDC @ 4 A maximum, resistive load

# Chapter 2 – Installation

---

This chapter shows you how to install the Option 2 board, upgrade Option 2 firmware, and make wiring connections for Option 2 functions. The chapter also provides instructions for installing a motor current transducer.

## Installing the Option 2 Board

### NOTICE

If your Option 2 board comes pre-installed with the WPC 2000 Main Processor Board, skip this section and proceed to the wiring procedures, starting on page 28.

To install the WPC 2000 Option 2 board (see Figure 2-1, next page) perform the following steps:

### CAUTION

#### DAMAGE TO BOARD FROM STATIC DISCHARGE

Ground yourself before touching circuit boards or chips by touching a large metal object such as the press. Static electricity can destroy electronic components.

**Failure to comply with these instructions could result in property damage.**

1. Making sure you are grounded, carefully unpack the Option 2 board and remove it from its anti-static bag.

### NOTICE

Be sure to save the shipping box in case you need to return the Option 2 board.

2. Verify that the board has not been damaged during shipment. If damage has occurred, contact Wintriss Tech. Support immediately.

### WARNING

#### ELECTRIC SHOCK HAZARD

- Ensure that the power source is off before you replace electronic components in a control.
- Disconnect power from the machinery it is connected to before replacing electronic components. This includes disconnecting power to the machine control and motor.
- Ensure that servicing is performed by qualified personnel.

Failure to comply with these instructions could result in death or serious injury.

3. Shut off power to WPC 2000.
4. Open the WPC 2000 enclosure or console.

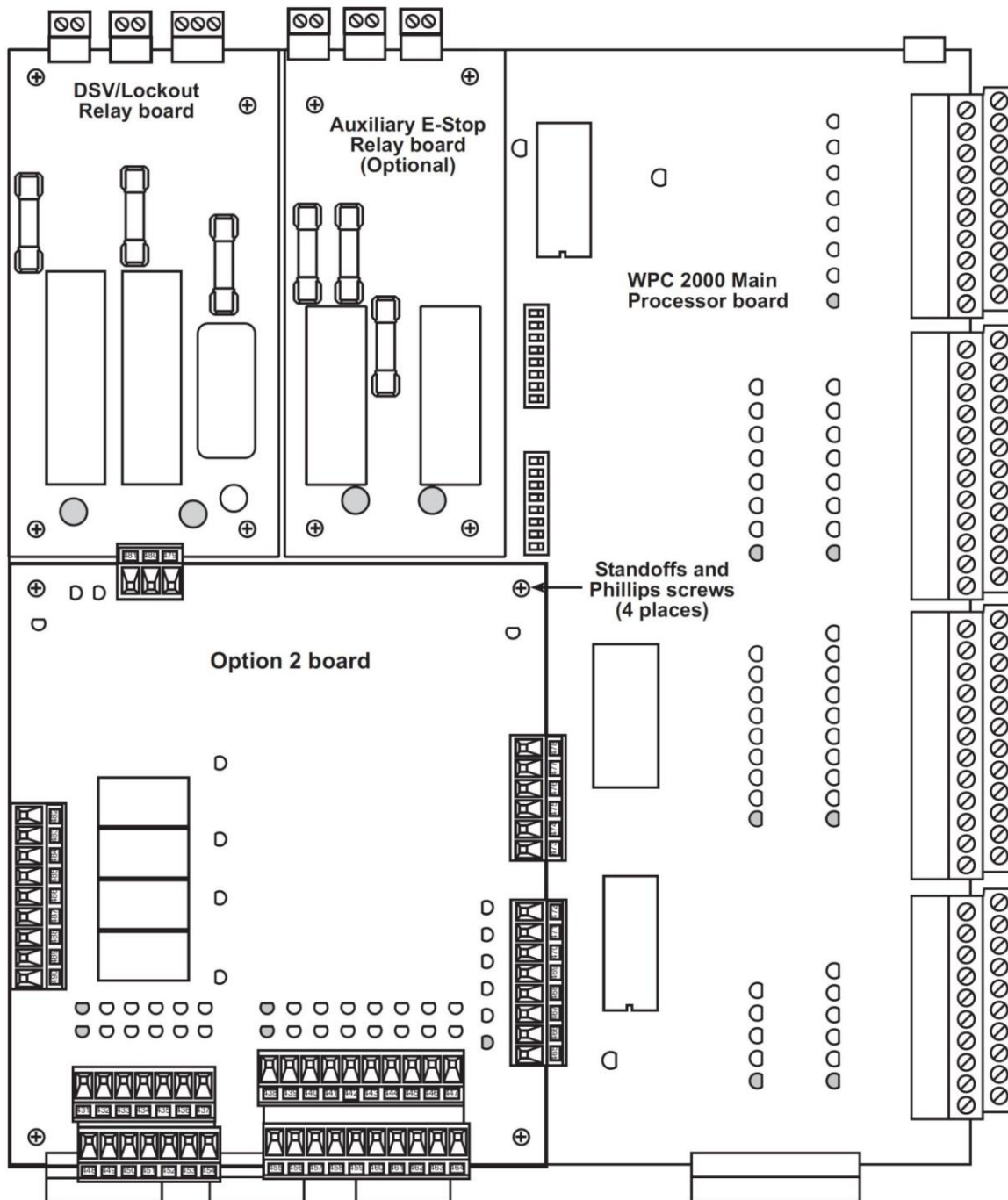


Figure 2-1. Option 2 Board Installed on WPC 2000 Main Processor Board

5. Locate the four ¼-in. hex standoffs in the lower left corner of the WPC 2000 Main Processor board.



**NOTICE**

If there are six ¼-in. standoffs in the area where the Option 2 board is to be installed, remove the top middle and bottom middle standoffs, using a ¼-in. nut driver. Be sure to remove the screws underneath the standoffs so they don't short out the board.

6. Making sure you are grounded, align the holes in the four corners of the Option 2 board with the four standoffs on the WPC 2000 Main Processor board (refer to Figure 2-1 for correct placement of board), align the two connectors on the underside of the Option 2 board with their mating connectors on the WPC 2000 board, and slowly push the board down until both connectors are seated. Then screw the board down, using the Phillips screws provided.
7. Wire the CAN bus connector (TB605) on the Option 2 board to TB108 on the WPC 2000 board, referring to Table 2-1, below, and Figure 2 at the end of the manual.

*Table 2-1. Option 2 Board: CAN Bus Wiring Connections (TB605)*

Option 2 Board TB605 Pin #	Function	WPC 2000 Board TB108 Pin #
481	CAN +	117
480	Shield	118
479	CAN –	119

**NOTICE**

Make sure to route the CAN bus wiring so that it doesn't interfere with wiring Option 2 terminal blocks or replacing the Option 2 firmware chip. One solution is to run the wiring beneath the Option 2 board.

**NOTICE**

If you receive a pre-wired CAN bus wiring kit, make sure you connect the 3-pin plug to the 3-pin TB605 connector on the Option 2 board and the 5-pin plug to the 5-pin TB108 connector on the WPC 2000 board.

8. If you are ready to make wiring connections to the Option 2 board, go to the appropriate wiring instructions on the following pages. Otherwise, close the door of the WPC 2000 enclosure or console.

## Replacing Option 2 Firmware

If you upgrade Option 2 firmware (e.g., from the standard offering to firmware that provides lube and/or speed control, or from a lower to a higher version number), you will have to replace the Option 2 firmware chip. To do so, follow these steps:

### **WARNING**

#### **ELECTRIC SHOCK HAZARD**

- Ensure that the power source is off before you replace electronic components in a control.
- Disconnect power from the machinery it is connected to before replacing electronic components. This includes disconnecting power to the machine control and motor.
- Ensure that servicing is performed by qualified personnel.

**Failure to comply with these instructions could result in death or serious injury.**

1. Turn off power to the system.

### **CAUTION**

#### **DAMAGE TO BOARD FROM STATIC DISCHARGE**

Ground yourself before touching circuit boards or chips by touching a large metal object such as the press. Static electricity can destroy electronic components.

**Failure to comply with these instructions could result in property damage.**

2. Making sure that you are grounded, open the enclosure and find the Option 2 firmware chip (U603) on the Option 2 board (see Figure 2-2, page 29). Note the direction in which the notch on the chip faces. A newer board may not have a firmware chip inserted; the standard code may be stored directly in the board's memory.

### **NOTICE**

The new Option 2 firmware chip must be installed with the notch facing in the same direction as the notch on the chip you just removed.

### **CAUTION**

#### **DAMAGE TO PC BOARD**

Insert the screwdriver between the chip and the socket. Be careful not to insert the screwdriver under the socket, as you may damage the board.

**Failure to comply with these instructions could result in property damage.**

3. Insert a small screwdriver between the bottom of the chip and the socket, and carefully pry the old chip from the board. Put the old chip aside.
4. Open the package containing the new Option 2 chip and remove the chip from its holder. If there was no firmware chip inserted and the code was stored in the memory, any new code inserted via firmware chip will take precedence.

**CAUTION****WRONG INSTALLATION DAMAGES CHIP**

Install the chip with the notch facing in the same direction as the notch on the chip you just removed; otherwise, when you power up the control, the chip will be destroyed. The socket into which you plug the chip is also notched, and the notch on the chip should be aligned with the notch in the socket.

**Failure to comply with these instructions could result in property damage.**

5. Plug the chip into the firmware socket, inserting the upper row of pins first, then aligning the bottom row of pins over the socket and pushing them in. Make sure that the notch in the chip faces in the same direction as the notch in the socket (see Figure 2-2, page 29) and that all of the pins are plugged into the socket.

**NOTICE**

If the two rows of pins are spread too far apart to plug easily into the socket, hold the chip on its side on a flat surface with the pins pointing toward you. Being careful not to overbend the pins, gently draw the top of the chip toward you until the pins bend a little. Turn the chip over so that the other row of pins is now flat and pointing toward you. Draw the top of the chip toward you again until the pins bend. When the rows of pins look parallel, plug the chip into its socket again. If the chip still doesn't fit, repeat this procedure.

6. Double-check to make sure that the notch in the firmware chip faces in the same direction as the notch in the socket.
7. Turn on power to the system, and wait for either the Program or Run screen to display. Then turn off power, and turn on power a second time so that the new program can take effect.
8. Access the List of Installed Options screen (select INSTALLED OPTIONS on the SmartPAC PRO Main Initialization Menu), and make sure that the correct version of Option 2 is displayed in the list.
9. If the correct version of Option 2 does not appear among the installed options, one or more of the pins on the firmware chip may be bent, or the chip may not be plugged in properly.

Turn off power to the SmartPAC PRO and WPC 2000, remove the firmware chip, and try straightening and realigning the pins, following the instructions in the Notice following step 5. Reinstall the chip and cycle power two times, as in step 7. If the correct Option 2 firmware is still not shown in the list of installed options, call Wintriss Tech. Support.

## Wiring User Inputs

### **⚠ DANGER**

#### **USER INPUTS 1 THROUGH 7 AND 12 THROUGH 31 NOT SUITABLE FOR SAFETY USE**

DO NOT use inputs 1 through 7 or 12 through 31 as part of any personnel protection system.

These inputs are not control reliable.

**Failure to comply with these instructions will result in death or serious injury.**

### **⚠ DANGER**

#### **USER INPUTS ADD DELAY TO STOPPING TIME**

DO NOT connect light curtains or other presence-sensing devices to any user inputs.

Crosschecked

input pairs (8 & 9, 10 & 11, 32 & 33, 34 & 35, 36 & 37, and 38 & 39), though control reliable, are suitable only for such applications as connecting to safety switches used with interlocking barrier guards.

**Failure to comply with these instructions will result in death or serious injury.**

### **⚠ DANGER**

#### **CROSS-CHECKED INPUT PAIRS WIRED INCORRECTLY**

Wire and use input pairs 8 & 9, 10 & 11, 32 & 33, 34 & 35, 36 & 37, and 38 & 39 as instructed in this manual. These inputs are control reliable only if correctly wired in pairs.

**Failure to comply with these instructions will result in death or serious injury.**

### **⚠ DANGER**

#### **PRESS DOES NOT STOP WHEN USER INPUT ACTUATES**

- Remove the jumper from the Option 2 board connectors when you wire a user input. Option 2 comes from the factory with the inputs bypassed by jumpers. If you do not remove the appropriate jumper, Option 2 will not receive the signal from the input.
- Perform checkout procedures to ensure that the user inputs are wired correctly. Check after installation to make sure Option 2 responds correctly when the user input faults.

**Failure to comply with these instructions will result in death or serious injury.**

## **NOTICE**

### **INPUTS BYPASSED**

At the factory, the user inputs are jumpered to bypass their operation. Be sure to remove any jumper that bypasses operation of an input you use. Leave all unused inputs jumpered/bypassed

Wiring connections for WPC 2000 Option 2 user inputs are made on terminal blocks TB601 and TB602 on the Option 2 board (see Figure 2-2 next page). Pin numbers are shown in Table 2-2, page 30, and Figure 1 at the end of the manual. See *Expanded User Inputs*, page 17, for a description of Option 2 user inputs.

Wire from the terminal shown in Table 2-2, page 30, or Table 2-3, page 33, to your equipment and then back to either +24 VDC or ground. TB601 provides one +24 VDC terminal and one ground terminal. TB602 provides two +24 VDC terminals and two ground terminals.

If you remove any of the jumpers installed at the factory, make sure to bypass those user inputs either by connecting them to +24 VDC or ground or by setting the stop type to Unused in SmartPAC PRO Initialization. To set the stop type for and assign a name to user inputs, see *Setting User Input Stop Type and Name*, page 39.

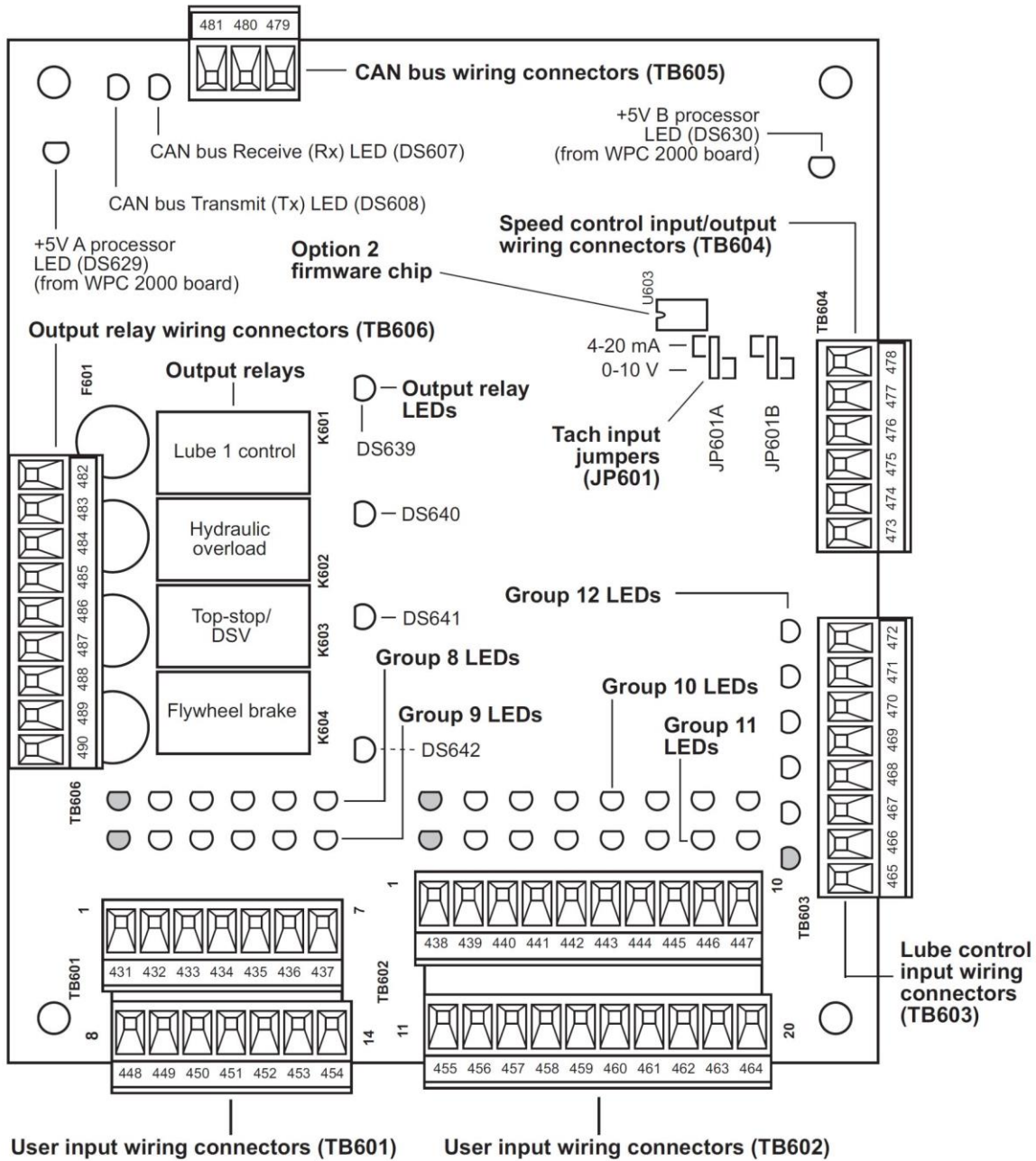


Figure 2-2. Option 2 Board: Location of Important Components

When you have finished wiring user inputs, check the LEDs for the appropriate pin numbers to make sure that your connections are good (see Figure 2-3, page 37). You can also check whether user inputs are “on” by displaying the appropriate input status screen (see *Viewing the Status of User Inputs*, page 42).

Table 2-2. Option 2 Board: User Input Wiring Connections (TB601)

Pin #	User Input	Terminal for Jumper Bypass Connection
Upper Row		
431	User input 32 + (cross-checked with user input 33)	+24 VDC
432	User input 34 + (cross-checked with user input 35)	+24 VDC
433	User input 12 –	Ground
434	User input 13 –	Ground
435	User input 14 –	Ground
436	User input 15 –	Ground
437	+24 V	
Lower Row		
448	User input 22 +	+24 VDC
449	User input 23 +	+24 VDC
450	User input 24 +	+24 VDC
451	User input 25 +	+24 VDC
452	User input 36 + (cross-checked with user input 37)	+24 VDC
453	User input 38 + (cross-checked with user input 39)	+24 VDC
454	Ground	
Upper Row		
438	User input 33 + (cross-checked with user input 32)	+24 VDC
439	User input 35 + (cross-checked with user input 34)	+24 VDC
440	User input 16 –	Ground
441	User input 17 –	Ground
442	User input 18 –	Ground
443	User input 19 –	Ground
444	User input 20 –	Ground
445	User input 21 –	Ground
446	+24 V	
447	+24 V	

Pin #	User Input	Terminal for Jumper Bypass Connection
Lower Row		
455	User input 26 +	+24 VDC
456	User input 27 +	+24 VDC
457	User input 28 +	+24 VDC
458	User input 29 +	+24 VDC
459	User input 30 +	+24 VDC
460	User input 31 +	+24 VDC
461	User input 37 + (cross-checked with user input 36)	+24 VDC
462	User input 39 + (cross-checked with user input 38)	+24 VDC
463	Ground	
464	Ground	

## Wiring Hydraulic Overload Inputs and Outputs

### NOTICE

#### OVERLOAD INPUT MUST BE JUMPERED WHEN NOT IN USE

Pin #468 on TB603 on the Option 2 board is jumpered at the factory. If your press is not equipped with a hydraulic overload system or you are not going to monitor it using Option 2, do not remove this jumper. If pin #468 is not jumpered, you will get continuous hydraulic overload error messages. There is no programming screen to disable the hydraulic overload feature.

If your press is equipped with a hydraulic overload system, the Option 2 board has wiring connections that allow monitoring of the associated pressure switch and provide the logic to stop the press and return it to normal operation after occurrence of a hydraulic overload. See *Hydraulic Overload Control*, page 18 for a description of the hydraulic overload feature.

To wire the hydraulic overload input, locate the pressure switch (refer to the wiring diagrams for your press or consult the press manufacturer) and connect one wire from it to pin #468 on TB603 on the Option 2 board and the other wire to one of the TB603 ground connections (i.e., pins #465 and #466). Refer to Table 2-4, page 33 and Figure 2 at the end of the manual. The pressure switch is normally closed to ground and opens in the event of a hydraulic overload.

The hydraulic overload output (see Table 1-1, page 22 for output relay specifications) is wired to the pump that repressurizes the hydraulic overload system after a hydraulic overload has occurred. The pump is part of the hydraulic overload system. Wire the pump to pins #484 and #485 on TB606 on the Option 2 board (refer to Table 2-5, page 36 and Figure 2 at the end of the manual).

The contacts on the relay associated with the hydraulic overload output are normally closed, and the pump is always on. When an overload occurs, the relay contacts open, causing the pump to turn off. When the ram has been returned to the top of its stroke (i.e., within the 270°-to-30° window), the pump turns back on to repressurize the system. The pump stays on during normal press operation.

## Wiring Flywheel Brake Inputs and Outputs

If your press is equipped with a flywheel brake, Option 2 provides wiring connections that allow the position of the brake to be monitored and the brake to be applied and released. See *Flywheel Brake Control*, page 19 for a description of the flywheel brake feature.

To make flywheel brake input connections, wire the pressure or limit switch associated with the flywheel brake to pin #467 on TB603 on the Option 2 board and to one of the TB603 ground connections (i.e., pin #465 or #466), referring to Table 2-4, page 33 and to Figure 2 at the back of the manual.

Wire flywheel brake output from pin #488 (N/O) or #490 (N/C) and pin #489 on TB606 (see Table 2-5, page 36) to the flywheel brake actuator.

The flywheel brake output turns the brake on and off based on the state of the press's main motor. When the motor is on, the flywheel brake is turned off. When the motor is off, the brake is turned on and applied to the flywheel.

When you have finished wiring flywheel brake input and output, you must enter settings for flywheel brake operation in SmartPAC PRO Initialization mode (see *Setting Flywheel Brake Initialization Parameters*, page 46).

## Wiring Top Stop Outputs

Option 2 provides an additional output connection that can be used for one of two functions:

- Top-stopping an ancillary device when the Top Stop button on the Operator Station is pressed or WPC 2000 issues a Top-stop command
- Resetting a Dual Safety Valve (DSV) when it has been tripped

See *Other Standard Features*, page 20, for a description of the top-stop and DSV reset functions.

You wire the ancillary device or DSV to pins #486 and #487 on TB606 (see Table 2-4, page 33, and Figure 2 at the end of the manual).

When you have finished wiring, you must enable the device you have wired in SmartPAC PRO Initialization mode (see *Setting Top Stop Output Mode*, page 47). If you have wired and initialized a DSV, instructions for resetting it are provided on page 60.

## Wiring Lube Control Inputs and Outputs

Terminal blocks on the Option 2 board provide wiring connections for three different lube systems: Lube 1, Monitor 1, and Monitor 2. Lube 1 provides both input and output connections. Monitor 1 and Monitor 2 provide input connections only. Option 2 also provides a Lube Motor On input that, when wired to a lube pump, can be programmed to initiate Monitor 1 and Monitor 2 operation.

When properly programmed (see *Making Lube Control Settings*, page 48), Lube 1 allows you to control operation of a lube control valve or other device and monitor the operation of cycle switches on the divider valves in the lube system fed by the pump. Monitor 1 and Monitor 2 can be programmed to monitor the operation of cycle switches in two other lube systems. See *Lube Control*, page 20, for a description of the lube control feature.



Lube control input connections are made on TB603 on the Option 2 board (see Figure 2-2, page 29 and Table 2-4, below). You make output connections on TB606 (see Table 2-5). See also Figure 2 at the end of the manual.

*Table 2-3. Option 2 Board: Lube Control and Other Input Connections (TB603)*

Pin #	Input Function	Associated LED (Group 12)
465	Ground	
466	Ground	
467	Flywheel brake monitor switch	1
468	Hydraulic overload pressure switch	2
469	Lube motor ON	3
470	Lube monitor 2 cycle switch	4
471	Lube monitor 1 cycle switch	5
472	Lube 1 limit switch	6

*Table 2-4. Option 2 Board: Lube Control and Other Output Connections (TB606)*

Pin #	Output Function	Associated LED
482	Lube 1 control N/O	DS639
483	Lube 1 control COM	
484	Hydraulic overload N/O	DS640
485	Hydraulic overload COM	
486	Top Stop N/O	DS641
487	Top Stop COM	
488	Flywheel brake N/O	DS642
489	Flywheel brake COM	
490	Flywheel brake N/C	

The Lube 1 output turns a lube control valve or other device on and off. A variety of lube control devices with different voltages can be wired to this output.

To wire the Lube 1 input, find the wires running from the cycle switch (there are typically two), then connect one of them to pin #472 on TB603 on the Option 2 board, the other to one of the TB603 ground connections (i.e., pin #465 or #466).

To make output connections for Lube 1, locate the wires from the lube control valve or other device that you are using to push lubricant through the system, and connect them to pins #482 and #483 on TB606 on the Option 2 board.

To wire Monitor 1 and Monitor 2 inputs, proceed as you did with the Lube 1 input. First, locate the appropriate wires on the cycle switches for the lube systems you want to monitor. Then, for

Monitor 1, connect one wire to pin #471 on TB603 and the other to one of the ground connections (i.e., pin #465 or #466). Connect wires for Monitor 2 to pin #470 on TB603 and to a convenient ground connection.

To wire the Lube Motor On input, locate the auxiliary relay on your lube pump motor starter. The relay contacts provide closure to ground when the lube pump motor comes on. (If your lube pump motor starter does not have a relay, you will have to install one in order to wire the Lube Motor On input.) Connect one side of the relay to pin #469 on TB603 and the other side to one of the TB603 ground connections (i.e., pin #465 or #466).

When you are finished wiring, you are ready to program your lube control inputs and outputs in SmartPAC PRO Initialization. Refer to *Making Lube Control Settings*, page 48.

## Wiring Analog Speed Control Inputs and Outputs

### NOTICE

You must have a variable speed press and motor drive that has a 0-10 VDC input for the Option 2 speed control feature to function properly. The motor drive may also have a 0-10 VDC or 4-20 mA tachometer generator output.

Terminal block TB604 on the Option 2 board (see Figure 2-2, page 29, and Table 2-5, page 36) provides input and output connections that allow you to monitor and control the speed of a variable speed press. See *Speed Control*, page 21 for a description of the Option 2 speed control feature.

Connect the 0-10 VDC input of the motor drive (sometimes referred to as a “speed pot”) to pin #478 on TB604.

If you are wiring a 4-20 mA tachometer generator output from your motor drive, connect the + TACH OUTPUT wire to pin #476 on TB 604 and the ground or negative wire to pin #475 (see Table 2-5, page 36) and Figure 2 at the end of the manual). Then set jumpers JP601A and JP601B to the “4-20 mA” position (see Figure 2-2).

If your tachometer generator output is 0-10 VDC, connect the TACH OUTPUT wire to pin #476 on TB604, as you did for the 4-20 mA signal, but connect the - TACH OUTPUT wire to pin #477 (Ground). Set jumpers JP601A and JP601B to the “0-10 VDC” position.

The tachometer input is used to receive feedback from the drive on how fast the motor is running (i.e., actual flywheel speed).

Refer to the wiring diagrams for your motor drive and press if you need additional help.

After you have wired speed control connections, you should enter speed limits in Initialization mode (see *Making Speed Control Settings*, page 58) and program speeds for individual tools in Program mode (see page 63). You can calibrate (see page 67) and adjust (see page 71) press speed in Run mode.

## Installing and Wiring a Motor Current Transducer

### NOTICE

Installation and wiring procedures will vary depending on the brand and model of the transducer you use. The following instructions are provided only as general guidelines. Follow the manufacturer's instructions when installing and wiring the transducer.

You can install an AC motor current transducer on one of the conductors for your motor drive to monitor the maximum and minimum percent of load on your motor. When the transducer is wired to Option 2, the current drawn by the motor on each stroke is displayed on the Press Control Run screen (see *Monitoring Motor Current*, page 72). You can use these readings to determine if your counterbalance pressure is set correctly.

When determining the brand and model of transducer that is best for your application, select one with a maximum amperage that is at least 60% greater than the maximum amperage of your motor. For example, if your motor has a rated amperage of 21A, choose a current transducer capable of sensing a minimum of 33A.

### Installing the Transducer

To install the motor current transducer, do the following:

1. Connect the wires you will be running to the Option 2 board to the terminals of the transducer.
2. Open the transducer's hinged base (if you are installing a split-core transducer), place the aperture of the transducer around one of the conductors for your press motor drive, and snap the base shut so the transducer completely encloses the conductor (i.e., the conductor runs through the transducer's aperture).

### NOTICE

If you are installing a solid-core current transducer, follow the manufacturer's instructions.

3. Secure the transducer to your motor control enclosure, using screws, two-sided tape, or other means.

### Wiring the Transducer

When the motor current transducer has been installed, do the following to wire it to the Option 2 board:

1. Connect the 0-10 VDC output wire from the transducer to pin #473 on TB604 on the Option 2 board and the ground wire to pin #474 (see Table 2-5, below, and Figure 2 at the end of the manual).
2. Select the desired output range by positioning the range jumper on the transducer.

### NOTICE

The high value in the range you select should be at least 60% greater than the rated amperage of your motor.

After you have installed and wired the motor current transducer, you must enter settings in SmartPAC PRO Initialization mode (see *Making Flywheel Brake and Related Settings*, page 44). Instructions for viewing and interpreting the motor current readout on the Press Control Run screen are provided starting on page 72.

*Table 2-5. Option 2 Board: Speed Control Connections (TB604)*

<b>Pin #</b>	<b>Function</b>
473	Motor current monitor input (0-10 VDC)
474	Ground
475	– Tachometer input (4-20 mA only)
476	+ Tachometer input (0-10 VDC or 4-20 mA)
477	Ground
478	Velocity output (0-10 VDC)

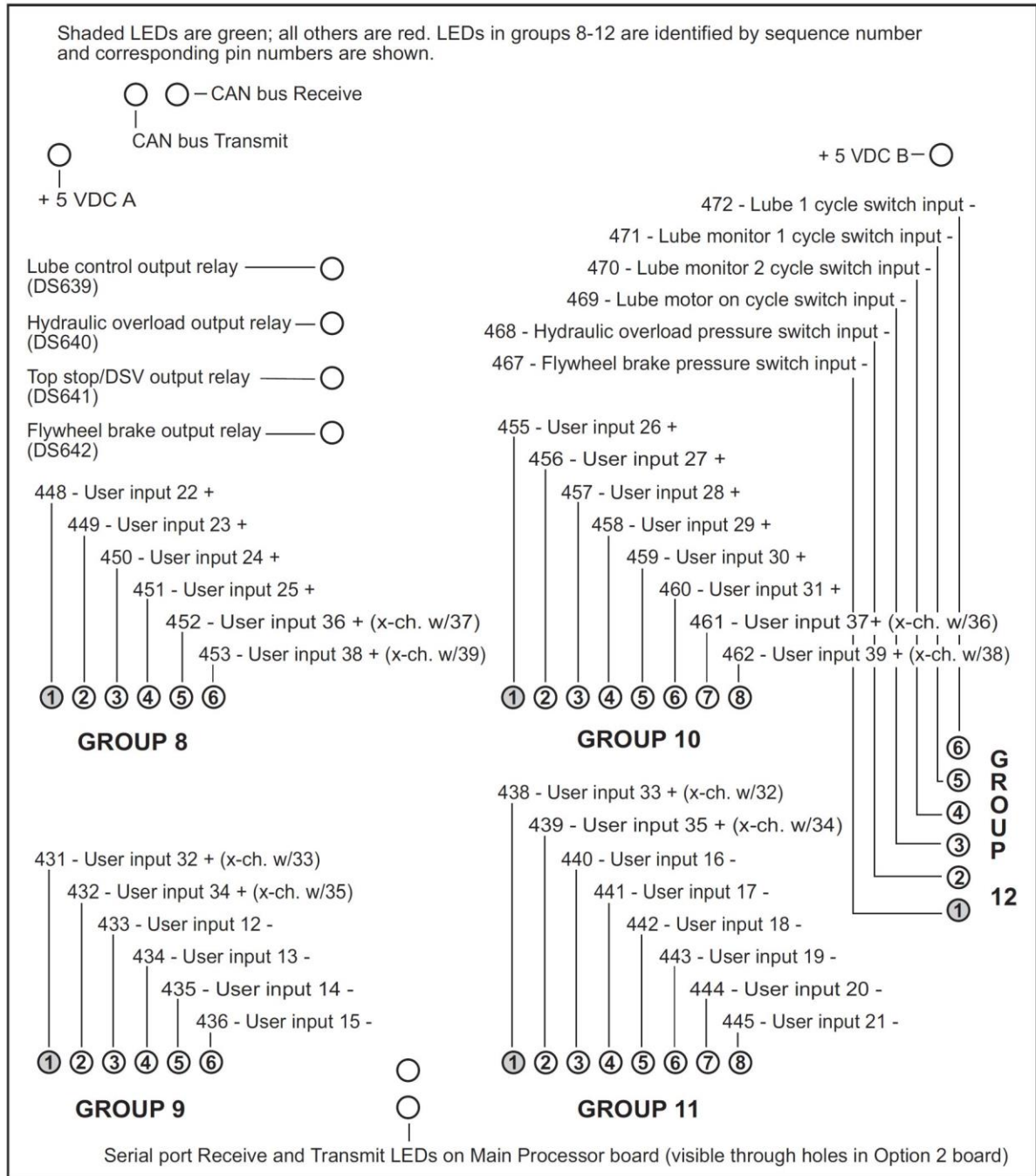


Figure 2-3. Option 2 Board: LED Map



# Chapter 3 – Setting Option 2 Initialization Parameters

This chapter shows you how to make Option 2 settings in SmartPAC PRO Initialization mode. The chapter also shows you how to view selected Option 2 settings. You perform these tasks on screens accessible from the SmartPAC PRO Main Initialization Menu.

## Accessing the SmartPAC PRO Main Initialization Menu

To access the SmartPAC PRO Main Initialization Menu, turn the Program/Run key to PROG, then INITIALIZATION MENU. The following screen should display.

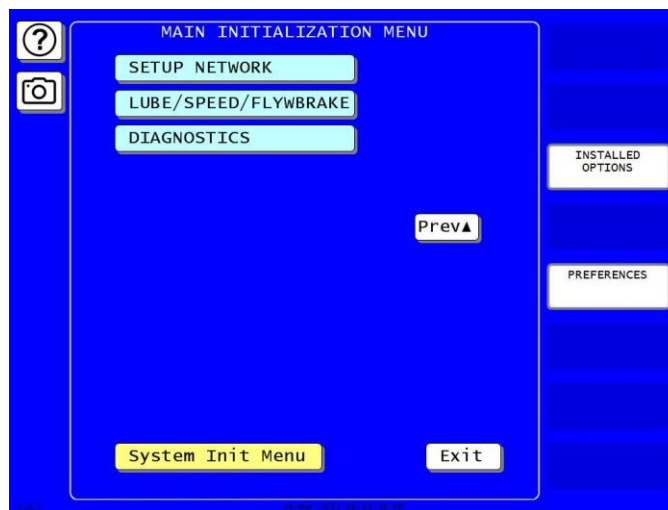


Figure 3-1. SmartPAC PRO Main Initialization Menu

## Making and Viewing User Input Settings

### Setting User Input Stop Type and Name

You can set the stop type for and assign a name to each user input wired to the Option 2 board (see *Wiring User Inputs*, page 28).

User inputs 12-31 can be set to Top-stop, Top-stop/Lockout (a new setting), E-stop, E-stop/Lockout, or Unused. Select the Unused setting to bypass inputs you are not connecting. Cross-checked input pairs 32/33, 34/35, 36/37, and 38/39 can only be set to E-stop or E-stop/Lockout. Cross-checked inputs must be jumpered to +24 VDC if they are not being used.

You cannot program control-reliable, cross-checked inputs 32-39 (or inputs 8-11 in WPC 2000) as Top-stop/Lockout or Unused. These safety inputs must be set as either E-stop or E-stop/Lockout.

## NOTICE

You cannot program control-reliable, cross-checked inputs 32-39 (or inputs 8-11 in WPC 2000) as Top-stop/Lockout or Unused. These safety inputs must be set as either E-stop or E-stop/Lockout.

A setup sheet on which you can document the name of each equipment item wired to Option 2 user inputs is provided in Appendix A, page 87.

To set the stop type and name for a user input, follow these instructions:

1. On the SmartPAC PRO Main Initialization Menu (see Figure 3-1, above), press PRESS CONTROL. The WPC Initialization Menu, shown in Figure 3-2, displays.

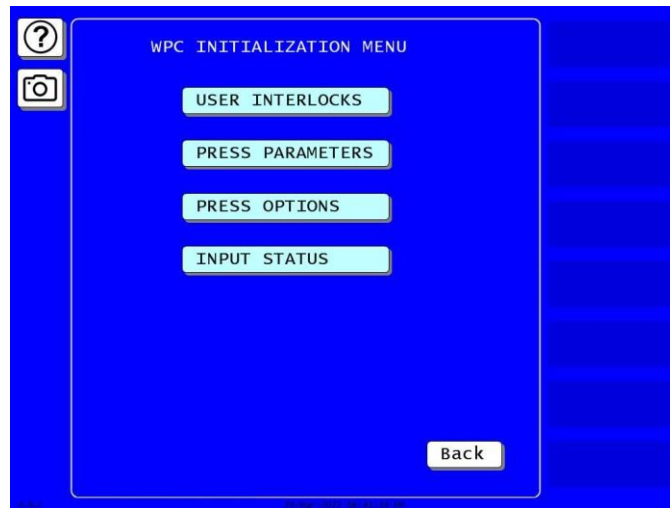


Figure 3-2. WPC Initialization Menu

2. On the WPC Initialization Menu, USER INTERLOCKS. The Change User Interlocks screen displays, Figure 3-3.

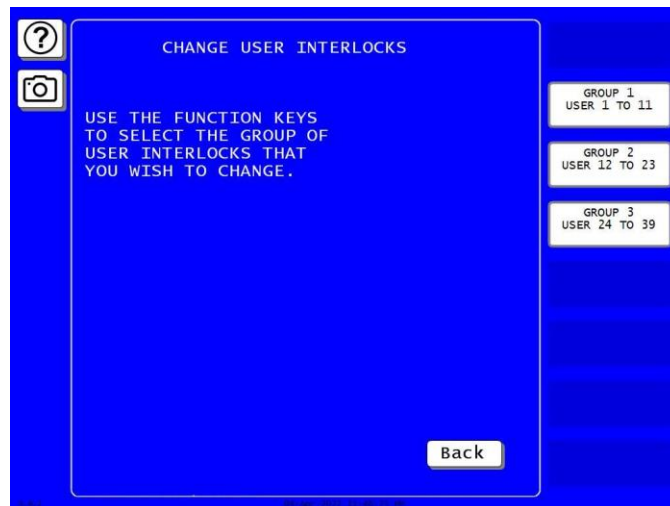


Figure 3-3. Change User Interlocks Screen



- Press the button indicating the group of user inputs (i.e., Group 1, Group 2, or Group 3) that contains the user input you wish to set. The Press Control Interlock Menu for that user input group displays (see Figure 3-4, which shows the Group 2 screen) with the default stop type for the first user input in the group highlighted.



Figure 3-4. Press Control User Interlock Menu for Group 2 User Inputs

- Move the highlight bar to the stop type of the user input you want to set, using the Up Arrow (▲) or Down Arrow (▼), then press ENTER repeatedly until the appropriate stop type setting (e.g., T LOC, T STOP, etc.) displays.

## NOTICE

Each time you press ENTER, the stop type setting cycles to the next option (i.e., E STOP, T STOP, E LOC, T LOC, or UNUSED). The T STOP, T LOC, and UNUSED options are not available for control-reliable, cross-checked inputs (i.e., inputs 32-39).

You may also set the stop type to UNUSED, in which case that user input is bypassed. User inputs can also be bypassed by connecting them to either +24 VDC (PNP inputs) or ground (NPN inputs). Cross-checked inputs (i.e., inputs 32-39) cannot be set to UNUSED and must be jumpered to +24 VDC if they are not being used.

- To assign a name to an auxiliary equipment item, move the highlight bar to the uncaptioned NAME column, using the Right Arrow (▶) cursor key, then up or down to the UNNAMED entry for the user input you want to name. Press ENTER to display the Select Stop Name screen, and follow the directions on the screen.

Detailed instructions for assigning user input names can be found in the SmartPAC PRO with WPC 2000 Integration user manual. A setup sheet on which you can document equipment name/user input assignments is provided in Appendix A (page 87).

- When you are finished, press Back to save your settings. You are returned to the Press Control User Interlock Menu. Press Back two more times to return to the WPC Initialization Menu.

## Viewing the Status of User Inputs

You can view the status of WPC 2000 Option 2 user inputs just as you can view status of user inputs 1-11 in WPC 2000. Viewing input status is a useful diagnostic tool for troubleshooting your Option 2 user inputs and the auxiliary equipment they are connected to.

To view input status, follow these steps:

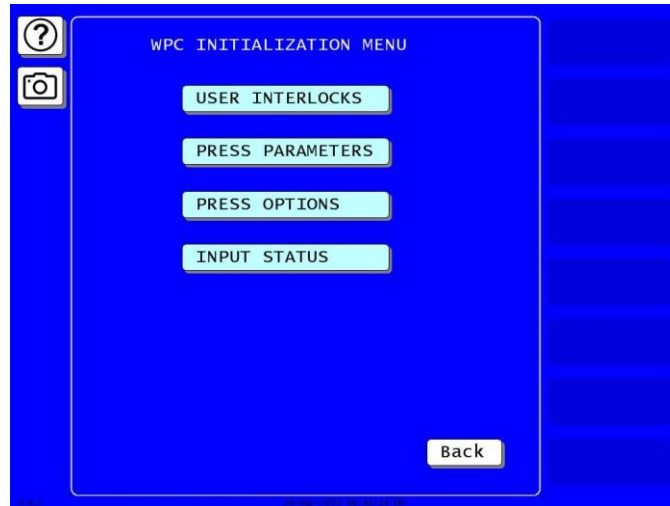


Figure 3-5. WPC Initialization Menu

1. On the WPC Initialization Menu (see Figure 3-5, above), press INPUT STATUS. The Display WPC Input Status screen displays, Figure 3-6.

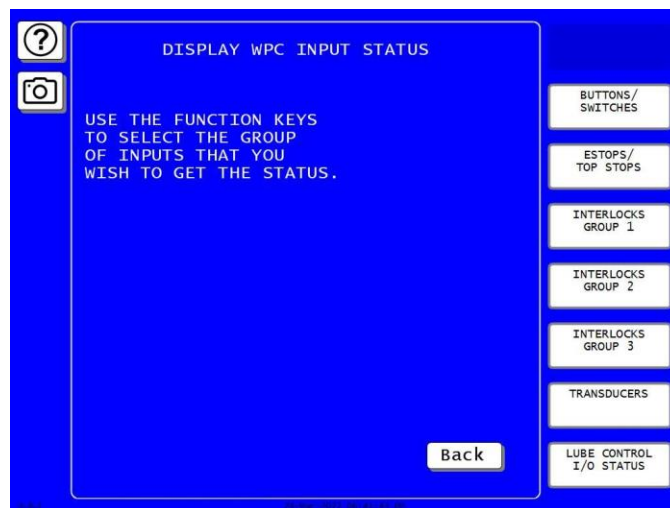
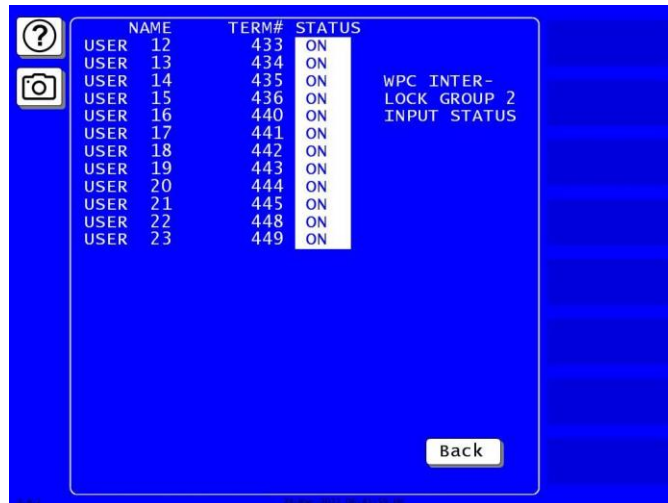


Figure 3-6. Display WPC Input Status Screen

2. Press the button indicating the group of user inputs (i.e., Group 1, Group 2, or Group 3) that contains the user input you want to view. The WPC Interlock Input Status screen for that user input group displays (see Figure 3-7), which shows Group 2 inputs.



NAME	TERM#	STATUS
USER 12	433	ON
USER 13	434	ON
USER 14	435	ON
USER 15	436	ON
USER 16	440	ON
USER 17	441	ON
USER 18	442	ON
USER 19	443	ON
USER 20	444	ON
USER 21	445	ON
USER 22	448	ON
USER 23	449	ON

WPC INTER-LOCK GROUP 2 INPUT STATUS

Back

Figure 3-7. WPC Interlock Group 2 Input Status Screen

The status of all user inputs (OFF or ON) is shown in the STATUS column. Inputs that are ON are highlighted. OFF inputs are not highlighted. In addition, an OFF input may generate the fault code specific to that input on the SmartPAC PRO display. “Unused” inputs show an OFF status but do not generate a fault code display.

## Accessing the Lube/Speed/Flywheel Brake Init. Menu

Access the Lube/Speed/Flywheel Brake Initialization Menu from the SmartPAC PRO Main Initialization Menu, as shown in Figure 3-8. Press LUBE/SPEED/FLYWBRAKE.

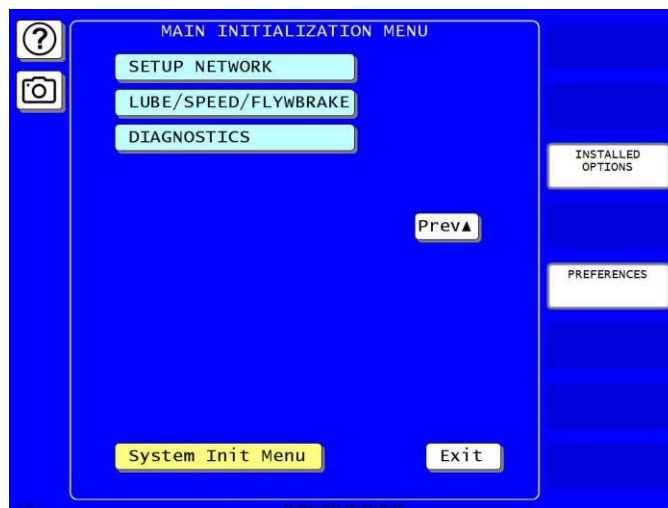


Figure 3-8. SmartPAC PRO Main Initialization Menu

The Lube/Speed/Flywheel Brake Initialization menu, (see Figure 3-9, next page) displays.

## Making Flywheel Brake and Related Settings

Initialization settings for flywheel brake control and related features are made on the Flywheel Brake Setup screen (see Figure 3-10), which you access by selecting FLYWHEEL BRAKE INITIALIZATION on the Lube/Speed Flywheel Brake Initialization Menu, Figure 3-9.



Figure 3-9. Lube/Speed/Flywheel Brake Initialization Menu

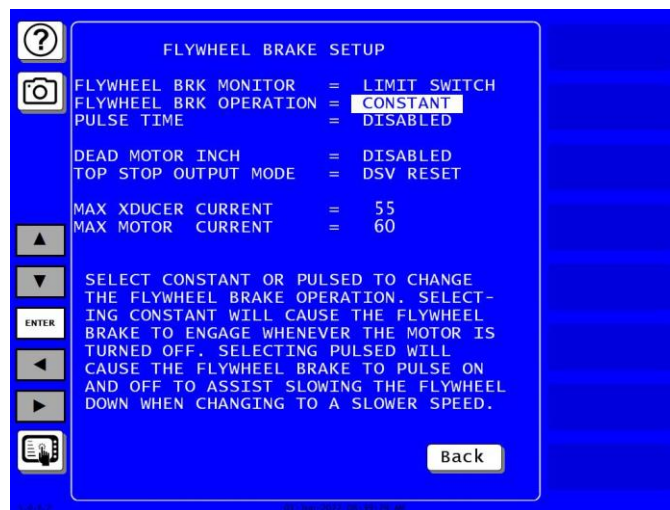


Figure 3-10. Flywheel Brake Setup Screen

Table 3-1 describes the settings you can make on the Flywheel Brake Setup screen. Procedures for making the settings are shown following the table.

Table 3-1. Flywheel Brake Setup Screen Settings

Setting	Description
FLYWHEEL BRK MONITOR	Flywheel Brake Switch Type. The type of switch used to monitor operation of the flywheel brake. Available settings are: PRESS. SWITCH Flywheel brake is monitored by a pressure switch LIMIT SWITCH Flywheel brake is monitored by a limit switch DISABLED Flywheel brake monitoring feature is disabled
FLYWHEEL BRK OPERATION	Flywheel Braking Type. The type of braking used to bring the flywheel to a stop or to slow its speed. Available settings are: <p>CONSTANT Brake is applied to flywheel with constant pressure when the press motor is turned off.</p> <p>PULSED Brake is applied to flywheel in pulses (pulse length is specified in the PULSE TIME field) when press speed is changed from a higher to a lower value. There is a 1-second interval between pulses. This setting can only be used when the speed control option is installed and your motor drive has tachometer output. The PULSED setting does not affect brake operation when the press motor is turned off.</p>
PULSE TIME	Pulse Braking Time. The length of time (in seconds) that the flywheel brake is applied during a single pulse. Range: 1-5 seconds. This field can only be entered when the setting in the FLYWHEEL BRK OPERATION field is PULSED.
DEAD MOTOR INCH	Dead Motor Inch Status. The status of the Dead Motor Inch feature (i.e., enabled or disabled). "Dead Motor Inch" prevents the flywheel brake from being applied when the press motor is turned off with the Stroke Select switch in INCH position, allowing the operator to Inch the press for a brief time after the press is shut down. The Run/Inch buttons on the operator station must be pressed at least once every 15 seconds after the motor is turned off to prevent the flywheel brake from being applied.
TOP STOP OUTPUT MODE	Top Stop Output/DSV Reset Mode. The output mode to be used for pins #486/487 on TB606 on the Option 2 board. Settings are: <p>TOP STOP The equipment wired to this output will be top-stopped whenever the Top Stop button on the operator station is pressed or the Top-stop string is opened.</p> <p>DSV RESET The Dual Safety Valve (DSV) wired to this output will be reset when you press DUAL VALVE RESET on the WPC Initialization Menu.</p>
MAX XDUCER CURRENT	Maximum Transducer Current. The rated amperage of the transducer you are using to measure motor current. This value should be 150-200% of the rated amperage of your press motor.
MAX MOTOR CURRENT	Maximum Motor Current. The rated amperage of the motor that runs your press.

## Setting Flywheel Brake Initialization Parameters

Flywheel brake control initialization settings specify how operation of your press's flywheel brake is monitored and controlled. You can select the type of switch (pressure or limit switch) being used to monitor operation of the flywheel brake and the type of brake action (constant or pulsed) used to stop or slow the flywheel. If you select the PULSED setting, you can specify the length of time (1-5 seconds) that the brake is applied during each pulse when the speed of the press is changed from a higher to a lower value. There is a 1-second interval between pulses.

The flywheel brake can be pulsed only if your Option 2 has the speed control feature and your motor drive has a tachometer output. When you select the PULSED setting, the flywheel brake is pulsed whenever the speed of the press is changed from a higher to a lower setting, and the brake is applied with constant pressure when the motor is turned off. When the CONSTANT setting is selected, the flywheel brake is applied only when the press motor is turned off.

You can also disable the flywheel brake control feature on the Flywheel Brake Setup screen.

To set initialization parameters for flywheel brake operation, do the following:

1. With the highlight bar on the FLYWHEEL BRK MONITOR setting, press ENTER repeatedly until the setting you want (i.e., PRESS. SWITCH, LIMIT SWITCH, or DISABLED) is displayed.
2. Move the highlight bar to the FLYWHEEL BRK OPERATION setting, using the Down Arrow (▼), and press ENTER repeatedly until the setting you want displays.

### NOTICE

The PULSED setting can be used only if your Option 2 has speed control and your motor drive has a tachometer output. When PULSED is selected, the flywheel brake is applied in pulses whenever press speed is changed from a higher to a lower setting. The brake is applied with constant pressure when the press motor is turned off.

3. If you have set the FLYWHEEL BRK OPERATION item to PULSED in step 2, move the highlight bar to the PULSE TIME setting, press ENTER repeatedly to cycle through the interval options (1 through 5 seconds) stopping at the desired interval.
4. Press Back to save your flywheel brake settings. You are returned to the Lube/Speed/Flywheel Brake Initialization menu.

## Enabling the “Dead Motor Inch” Feature

The “Dead Motor Inch” feature allows the operator to run the press in Inch mode for a short time after the press motor has been turned off. When this feature is enabled, the flywheel brake is not activated as it normally is when power to the motor is shut down as long as the press is in Inch mode.

The operator must press the Run/Inch buttons on the operator station at least once every fifteen seconds after the motor is turned off to maintain the flywheel brake in this suspended state and to continue to operate the press in Dead Motor Inch.

This feature is not available in Single-stroke or Continuous mode. If the operating mode is changed from Inch to one of these alternative settings while the press is in Dead Motor Inch, the flywheel brake is immediately applied.

To enable the “Dead Motor Inch” feature, do the following:

1. On the Flywheel Brake Setup screen, move the highlight bar to the DEAD MOTOR INCH setting, and press ENTER to change the setting from DISABLED (the default) to ENABLED.
2. Press Back to save your setting. You are returned to the Lube/Speed/Flywheel Brake Initialization menu.

## Setting Top Stop Output Mode

The TOP STOP OUTPUT MODE item allows you to specify the type of device (i.e., piece of ancillary equipment or Dual Safety Valve) that is wired to pins #486/487 on TB606 on the Option 2 board (see *Wiring Top Stop Outputs*, page 32).

When the TOP STOP setting is selected and a piece of ancillary equipment is wired correctly to these pins (see *Wiring Top Stop Outputs*, page 2-10), that ancillary device is top-stopped whenever the operator presses the Top Stop button on the operator station or the SmartPAC PRO/WPC 2000 Top-stop string is opened.

When the TOP STOP OUTPUT MODE setting is DSV RESET and a Dual Safety Valve (DSV) is wired correctly to pins #486/487, an F47 error message displays whenever the DSV is tripped (see page 82). You can reset the DSV by pressing DUAL SAFETY RESET on the WPC Initialization Menu (see *Resetting a Dual Safety Valve (DSV)*, page 60).

To set the TOP STOP OUTPUT MODE item, do the following:

1. On the Flywheel Brake Setup screen, move the highlight bar to TOP STOP OUTPUT MODE, and press ENTER until the setting you want (i.e., TOP STOP or DSV RESET) is displayed.
2. Press Back to save your setting. You are returned to the Lube/Speed/Flywheel Brake Initialization menu.

## Setting Maximum Transducer and Motor Current

The maximum and minimum motor load percentages displayed on the Press Control Run screen (see *Monitoring Motor Current*, page 72) are calculated using values you set on the Flywheel Brake Setup screen. Motor load percentage is calculated by dividing the current sensed by the transducer by the rated amperage (MAX MOTOR CURRENT) of your press motor. The range of amperages that can be sensed by the transducer is determined by the MAX XDUCER CURRENT setting, which establishes the high value in the amperage range.

The MAX XDUCER CURRENT value is equivalent to the 10 VDC output of the transducer. The amperage range is scaled to the voltage range so that the transducer outputs a voltage that is proportional to the sensed amperage.

To make maximum transducer and motor current settings, do the following:

1. Select FLYWHEEL BRAKE INITIALIZATION on the Lube/Speed/Flywheel Brake Initialization menu to access the Flywheel Brake Setup screen (see Figure 3-10).

### NOTICE

The MAX XDUCER CURRENT value is equal to the 10 VDC output of the transducer. The setting in this field should be at least 60% greater than the rated amperage of the press motor (i.e., the MAX MOTOR CURRENT).

2. On the Flywheel Brake Setup screen, move the highlight bar to the MAX XDUCER CURRENT setting, press ENTER, type the value you want in the number entry window, and press ENTER again.

### NOTICE

Normally, the amperage rating of your motor is shown on the motor's nameplate. If you don't know the amperage of your motor but do know its horsepower and voltage, you can calculate the amperage using the formula for a 3-phase AC motor,

Maximum motor current = (Motor horsepower x 690)/Voltage

3. Move the highlight bar to the MAX MOTOR CURRENT setting, press ENTER, type the value you want in the number entry window, and press ENTER again.
4. Press Back to save your current settings. You are returned to the Lube/Speed/Flywheel Brake Initialization menu.

## Making Lube Control Settings

You make lube control settings on the Press Lubrication Setup screen, which you access from the Lube/Speed/Flywheel Brake Initialization menu, Figure 3-11. Press LUBE CONTROL INITIALIZATION.



Figure 3-11. Lube/Speed/Flywheel Brake Initialization Menu

The View or Change Lubrication Setup menu, shown in Figure 3-12, displays.





Figure 3-12. View or Change Lubrication Setup Menu

Press CHANGE LUBE SETTINGS. The Press Lubrication Setup menu appears, Figure 3-13.

## NOTICE

When you select the View Lube Settings item on the View or Change Lubrication Setup menu, you are shown a view-only version of the Press Lubrication Setup screen. You cannot make changes on this screen, but the screen is useful for troubleshooting.

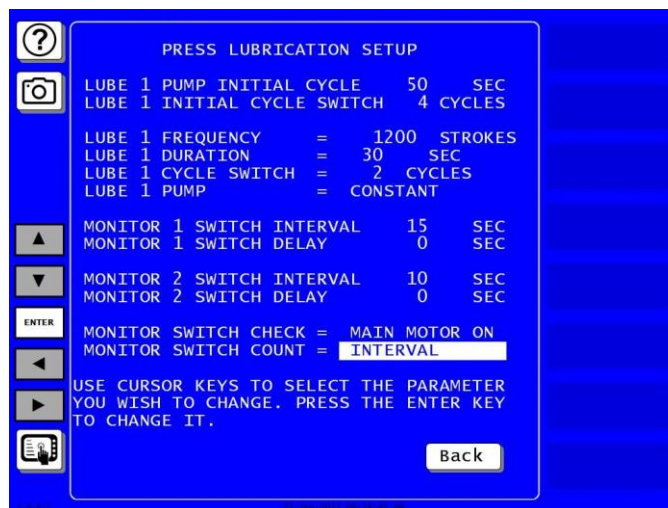


Figure 3-13. Press Lubrication Setup Screen

The Press Lubrication Setup screen allows you to program three separate lube systems. The first lube system, which is called Lube 1, can be programmed to turn a lube control valve or other device on and off and to monitor the status of the Lube 1 system. You can also program Lube 1 to perform an initial lubrication of the press before the clutch is engaged.

The other two lube systems, which are labeled Monitor 1 and Monitor 2, can be programmed only to monitor lube status.

The monitoring portion of lube programming for these three systems depends on signals from cycle switches on the divider valves that measure and dispense lubricant to the various parts of the press. If Option 2 does not receive one or more of these signals within a specified time frame, a lube fault is generated and the press is issued a Top-stop/Lockout command. A fault message is also displayed on the SmartPAC PRO front panel.

Descriptions of the settings you can make on the Press Lubrication Setup screen are shown in Table 3-2, below. Procedures for making the settings are provided following the table.

*Table 3-2. Press Lubrication Setup Screen Settings*

<b>Setting</b>	<b>Description</b>
LUBE 1 PUMP INITIAL CYCLE	Lube 1 Initial Lubrication Time Window. The length of time (in seconds) within which the number of cycles specified in the LUBE 1 INITIAL CYCLE SWITCH field must occur during an initial Lube 1 session (i.e., before the press is engaged) to prevent a lube fault. The Lube 1 control valve or other device will operate for the specified number of cycles or length of time (whichever comes first), then turn off. Maximum value: 400 seconds. See <i>Setting Lube 1 Initialization Parameters</i> , page 52.
LUBE 1 INITIAL CYCLE SWITCH	Lube 1 Cycles in Initial Lubrication Time Window. The number of cycle switch actuations that must occur within the time window specified in the LUBE 1 PUMP INITIAL CYCLE field to prevent a lube fault. If the number of cycles specified in this field is completed before expiration of the time window, the control valve or other device turns off. Maximum value: 100 cycles. See <i>Setting Lube 1 Initialization Parameters</i> , page 52.
LUBE 1 FREQUENCY	Lube 1 Lubrication Frequency. The number of minutes or strokes (MINUTES is the default) between regular Lube 1 lubrication sessions. When the specified time has elapsed, the Lube 1 control valve or other device turns on. The unit of measurement for this field (i.e., minutes or strokes) is selected by pressing Right Arrow (►) or Left Arrow (◄). Maximum value: 65535 strokes or 283 minutes. See <i>Setting Lube 1 Initialization Parameters</i> , page 52.
LUBE 1 DURATION	Lube 1 Lubrication Time Window. The length of time (in seconds) within which the number of cycles specified in the LUBE 1 CYCLE SWITCH field must occur during a regular Lube 1 lubrication session to prevent a lube fault. The Lube 1 control valve or other device will operate for the specified number of cycles or length of time (whichever comes first), then turn off. Maximum value: 250 seconds. See <i>Setting Lube 1 Initialization Parameters</i> , page 52.
LUBE 1 CYCLE SWITCH	Lube 1 Cycles in Lubrication Time Window. The number of cycles that must occur within the time window specified in the LUBE 1 DURATION field to prevent a lube fault. If the number of cycles specified in this field is completed before expiration of the time window, the control valve or other device turns off. Maximum value: 100 cycles. See <i>Setting Lube 1 Initialization Parameters</i> , page 52.

Setting	Description
LUBE 1 PUMP	<p>Lube 1 Dispensing Type. The way in which lubrication is to be dispensed by a control valve or other device in a regular Lube 1 lubrication session. Available settings are:</p> <p>    <b>CONSTANT</b>   Lubrication is dispensed in a constant flow (Default)</p> <p>    <b>PULSED</b>     Lubrication is dispensed in 3-second pulses with a 3-second interval between pulses</p> <p>The <b>CONSTANT</b> setting is recommended for recirculating systems, the <b>PULSED</b> setting for grease pump systems.</p> <p>See <i>Setting Lube 1 Initialization Parameters</i>, page 52.</p>
MONITOR 1 SWITCH INTERVAL	<p>Monitor 1 Lubrication Monitoring Window. The length of time (in seconds) within which one cycle switch actuation must occur in a Monitor 1 lube session to prevent a lube fault. Maximum value: 200 seconds.</p> <p>See <i>Setting Monitor 1 and 2 Initialization Parameters</i>, page 54.</p>
MONITOR 1 SWITCH DELAY	<p>Monitor 1 Delay Time. The length of time (in seconds) after startup of the device specified in the <b>MONITOR SWITCH CHECK</b> field at which to begin monitoring of the Monitor 1 lube system. Maximum value: 60 seconds. This can help prevent nuisance lube faults at startup.</p> <p>See <i>Setting Monitor 1 and 2 Initialization Parameters</i>, page 54.</p>
MONITOR 2 SWITCH INTERVAL	<p>Monitor 2 Lubrication Monitoring Window. The length of time (in seconds) within which one cycle switch actuation must occur in a Monitor 2 lube session to prevent a lube fault. Maximum value: 200 seconds.</p> <p>See <i>Setting Monitor 1 and 2 Initialization Parameters</i>, page 54.</p>
MONITOR 2 SWITCH DELAY	<p>Monitor 2 Delay Time. The length of time (in seconds) after startup of the device specified in the <b>MONITOR SWITCH CHECK</b> field at which to begin monitoring of the Monitor 2 lube system. Maximum value: 60 seconds. This can help prevent nuisance lube faults at startup.</p> <p>See <i>Setting Monitor 1 and 2 Initialization Parameters</i>, page 54.</p>
MONITOR SWITCH CHECK	<p>Monitor 1 and Monitor 2 Initiating Device. The device to be used to initiate Monitor 1 and Monitor 2 lubrication sessions. When the device is actuated, Monitor 1 and Monitor 2 sessions begin. If a delay has been specified in the <b>MONITOR 1 SWITCH DELAY</b> or <b>MONITOR 2 SWITCH DELAY</b> field, monitoring begins after the number of seconds set for that delay. Available settings are:</p> <p>    <b>MAIN MOTOR ON</b>   Monitoring is initiated when main motor is turned on (Default)</p> <p>    <b>DSV ON</b>            Monitoring is initiated when Dual Safety Valve (DSV) is actuated (i.e., when the press is engaged)</p> <p>    <b>LUBE MOTOR IN</b>   Monitoring is initiated when a ground signal is received from the lube pump starter wired to pin #469 (<b>LUBE MOTOR ON</b>) on TB603 on the Option 2 board.</p> <p>See <i>Setting Monitor 1 and 2 Initialization Parameters</i>, page 54.</p>

Setting	Description										
MONITOR SWITCH COUNT	<p>If your recirculating lube system requires more than 60 cycle switch actuations per minute (1 per second) at the divider block, set MONITOR SWITCH COUNT to ACTUATIONS.</p> <p>Monitor Switch Check Actuations Setting:</p> <p>When Monitor Switch Count is set to Actuations, the system checks the number of actuations based on a 1-minute timer. Monitor Switch 1 and 2 Actuations can be set from 0 to 300 per minute. The default is 20/per minute. This timer starts based on the how the Monitor Switch Check is configured, i.e., MAIN MOTOR ON, DSV ON or LUBE MOTOR IN.</p> <p>Optionally, you can program Monitor 1 and 2 SWITCH DELAY for an initial delay between 0 and 60 seconds, which allows sufficient lube volume to flow through the lube system prior to monitoring. This can help prevent nuisance lube faults when you first start the press.</p> <p>Here's how it works:</p> <p>The number of actuations programmed into the SWITCH COUNT variable determines how often Option 2 looks at the cycle switches. The minimum acceptable pulse width at these inputs is 40 ms.</p> <table border="1" data-bbox="423 821 1187 1058"> <thead> <tr> <th data-bbox="423 821 805 869">Number of Actuations*</th> <th data-bbox="805 821 1187 869">Check Frequency</th> </tr> </thead> <tbody> <tr> <td data-bbox="423 869 805 917">Less than or equal to 5</td> <td data-bbox="805 869 1187 917">Every minute</td> </tr> <tr> <td data-bbox="423 917 805 966">Less than or equal to 15</td> <td data-bbox="805 917 1187 966">Every 30 seconds</td> </tr> <tr> <td data-bbox="423 966 805 1014">Less than or equal to 30</td> <td data-bbox="805 966 1187 1014">Every 15 seconds</td> </tr> <tr> <td data-bbox="423 1014 805 1058">Greater than or equal to 30</td> <td data-bbox="805 1014 1187 1058">Every 7.5 seconds</td> </tr> </tbody> </table> <p>*1 actuation = 2 transitions of the monitor input</p> <p>For example, if the system is programmed to look at 200 actuations per minute, Option 2 starts counting actuations after 7.5 seconds. This ensures a quick response if there is a lube problem. If after 7.5 seconds the Option 2 didn't see 25 actuations, it generates a lube fault error.</p> <p>INTERVAL      The system checks Monitor 1 and Monitor 2 switches by looking at how many seconds elapse between cycle pin ON and Off states.</p> <p>ACTUATIONS    The system checks Monitor 1 and Monitor 2 switches after the specified number of actuations.</p> <p>See <i>Setting Monitor 1 and 2 Initialization Parameters</i>, page 54.</p>	Number of Actuations*	Check Frequency	Less than or equal to 5	Every minute	Less than or equal to 15	Every 30 seconds	Less than or equal to 30	Every 15 seconds	Greater than or equal to 30	Every 7.5 seconds
Number of Actuations*	Check Frequency										
Less than or equal to 5	Every minute										
Less than or equal to 15	Every 30 seconds										
Less than or equal to 30	Every 15 seconds										
Greater than or equal to 30	Every 7.5 seconds										

## Setting Lube 1 Initialization Parameters

The Lube 1 function controls operation of two distinct lubrication cycles: an initial lubrication session that occurs before the clutch is engaged and regular lubrication sessions that begin after engagement of the clutch.

The initial Lube 1 lubrication session enables lubricant to be distributed to parts of your press, such as the counterbalance cylinders, that may need lubrication before the press begins operation.

You can specify the length of time that the Lube 1 control valve or other device operates during this initial lubrication session and the number of cycle switch actuations that must occur within this window to prevent a lube fault. The Lube 1 control valve or other device turns on automatically at

system power-up unless the Lube 1 initial session is disabled (i.e., zero is entered for both Lube 1 initial session time and cycle switch actuations).

Regular Lube 1 lubrication sessions begin after the press is engaged.

You can specify an interval between lubrication sessions (measured in either strokes or minutes), a time for each lubrication session, and the number of cycle switch actuations that must occur within this time window to prevent a lube fault. The Lube 1 control valve or other device turns on for the first regular Lube 1 session when the press begins stroking and after the number of strokes or minutes you specify for the Lube 1 session interval. The lube control device turns off after the time you set for each regular Lube 1 session. The device turns on again after the specified session interval.

You can also specify how the lube control valve or other device dispenses the lubricant: in a constant stream or in pulses. During pulsed operation, the pump or valve dispenses lubricant in 3-second pulses with a 3-second interval between pulses.

When a lube fault is generated, a Top-stop/Lockout command is sent to the press and a fault message is displayed on the SmartPAC PRO front panel.

Lube 1 regular sessions can be disabled by setting all values to zero (0).

To make settings for the Lube 1 function on the Press Lubrication Setup screen, do the following:

**NOTICE**

A convenient one-page lube program and setup guide is provided in Appendix B (see page B-1).

1. With the highlight bar on the LUBE 1 PUMP INITIAL CYCLE setting, press ENTER. When the number entry window displays, key in the number of seconds you want the initial lube session to run, using the numeric keypad, and press ENTER again.

**NOTICE**

You can also use the Up Arrow (▲) or Down Arrow (▼) to increment or decrement the existing setting in the number entry window.

2. Move the highlight bar to the LUBE 1 INITIAL CYCLE SWITCH setting, press ENTER. A numeric entry window appears. Key in the number of cycle switch actuations you want to occur during the initial lube session. Press ENTER.

**NOTICE**

To disable the Lube 1 Initial Cycle function, set both its values to zero (0).

3. Move the highlight bar to the LUBE 1 FREQUENCY setting, and, in a similar fashion, enter the number of minutes or strokes you want to occur between regular lubrication sessions. To change the units of measurement (i.e., minutes or strokes), press the Left Arrow (◀) or Right Arrow (▶) cursor key.
4. Move the highlight bar to the LUBE 1 DURATION setting, and enter the number of seconds you want each regular lube session to last.
5. Move the highlight bar to the LUBE 1 CYCLE SWITCH setting, and enter the number of cycle switch actuations you want to occur within each regular lube session.

6. Move the highlight bar to the LUBE 1 PUMP setting, and select the way in which you want lubricant dispensed in the Lube 1 system (i.e., constant or pulsed). To toggle between settings, press the ENTER key.

**NOTICE**

To disable the Lube 1 function, set its three numeric values to zero (0).

7. Press Back to save your entries. You are returned to the View or Change Lubrication Setup menu.

**NOTICE**

Each time you press Back after making changes on the Press Lubrication Setup screen, an initial lube cycle is initiated if one is programmed. As a result, too much lubricant may be delivered to the press.

While you are attempting to program optimum lube settings, it may be a good idea to use the view-only version of the Press Lubrication Setup screen when you want only to verify settings. No changes can be made on this screen, and no initial lube cycles are initiated when you exit from it.

## Setting Monitor 1 and 2 Initialization Parameters

Monitor 1 and Monitor 2 lube functions monitor feedback from a cycle switch on a divider valve to determine whether specific lube points on your press are receiving enough lubrication. These inputs are designed for lube systems in which the lube control valve or other device operates continuously. Monitor 1 and 2 are not recommended for lost oil lube systems.

Monitor 1 and Monitor 2 lubrication sessions are timed to begin at the actuation of one of three devices. You can select the device from the following options:

- Main motor
- Dual Safety Valve (DSV)
- Lube pump wired to pin #469 (LUBE PUMP ON) on the Option 2 board

You can also specify a monitoring window for each lubrication session within which at least one cycle switch actuation must occur to prevent a lube fault, and you can set a delay between actuation of the device you have selected and initiation of the first Monitor 1 or Monitor 2 session.

You can use this delay setting to allow time for sufficient lube volume to flow through the divider valve(s) after actuation of the device.

When a lube fault is generated, a Top-stop/Lockout command is sent to the press, and a fault message is displayed on the SmartPAC PRO front panel.

To disable Monitor 1 or 2, program its values to zero (0).

You can set each monitor to check after an interval of time or after a specified number of actuations (one ON/OFF cycle = one actuation).

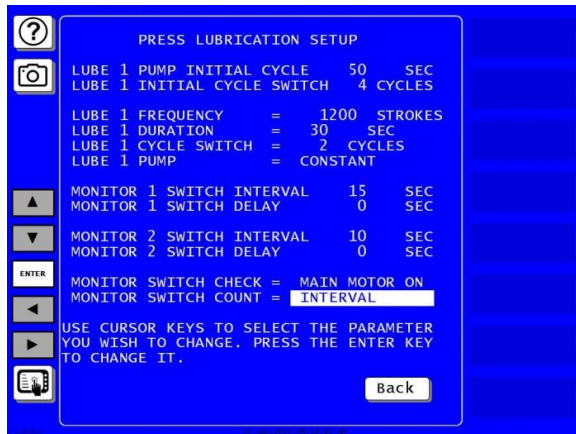


Figure 3-14. Press Lubrication Setup Screen, INTERVAL

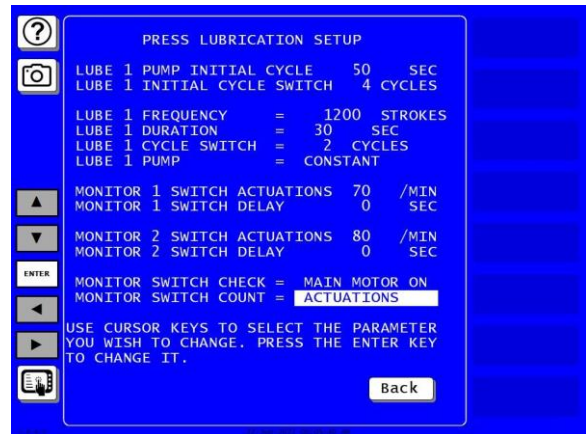


Figure 3-15. Press Lubrication Setup Screen, ACTUATIONS

Set to INTERVAL or ACTUATIONS, as follows:

1. Move the highlight bar to the MONITOR SWITCH COUNT setting.
2. Press ENTER to toggle between INTERVAL and ACTUATIONS. Note that the first entries for Monitor 1 Switch and Monitor 2 switch change to match this selection.

### ***Making INTERVAL Monitor 1 and Monitor 2 Lubrication Settings***

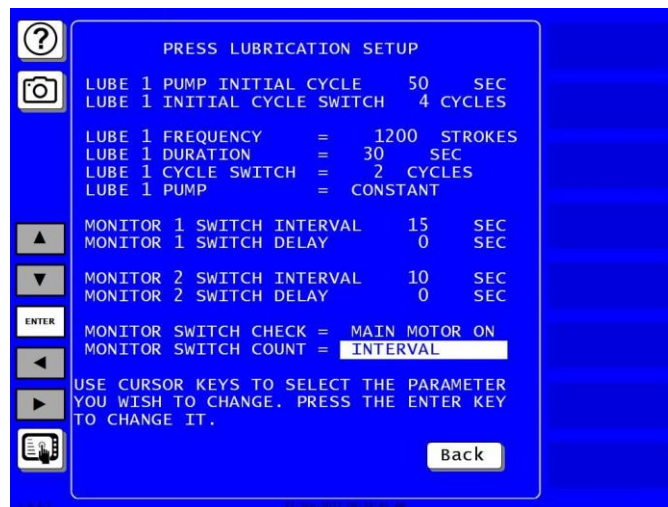


Figure 3-16. Press Lubrication Setup Screen with Monitor Switch Count Interval

To make INTERVAL Monitor 1 and Monitor 2 lubrication settings on the Press Lubrication Setup screen, set the Monitor Switch Count to INTERVAL (previous section) and follow the steps below.

Monitor 1 and Monitor 2 lubrication settings on the Press Lubrication Setup screen, follow the steps below. To make ACTUATION settings, go to *Making ACTUATIONS Monitor 1 and Monitor 2 Lubrication Settings*, page 56.

**NOTICE**

A convenient one-page lube program and setup guide is provided in *Appendix B* (see page 89).

1. Move the highlight bar to the MONITOR 1 SWITCH INTERVAL setting, and press ENTER. In the number entry window that displays, key in the number of seconds during which you want one cycle switch actuation to occur, using the numeric keypad, and press ENTER again.

**NOTICE**

You can also use the Up Arrow (▲) or Down Arrow (▼) cursor key to increment or decrement the existing setting in the number entry window.

2. Move the highlight bar to the MONITOR 1 SWITCH DELAY setting and press ENTER. In the number entry window that displays, key in the number of seconds you want to allow after actuation of the device you will set (step 4) in the MONITOR SWITCH CHECK field before initiating Monitor 1 monitoring sessions, using the ENTER key and numeric keypad as in step 1.
3. Repeat steps 1 and 2 for the MONITOR 2 SWITCH INTERVAL and MONITOR 2 SWITCH DELAY settings.

**NOTICE**

To disable the Monitor 1 or Monitor 2 function, set both its values to zero (0).

4. Move the highlight bar to the MONITOR SWITCH CHECK setting, and select the device (i.e., main motor, DSV, or lube pump) that you want to be used to initiate Monitor 1 and Monitor 2 sessions, pressing the ENTER key toggle among the options.
5. Press Back to save your settings. You are returned to the View or Change Lubrication Setup menu.

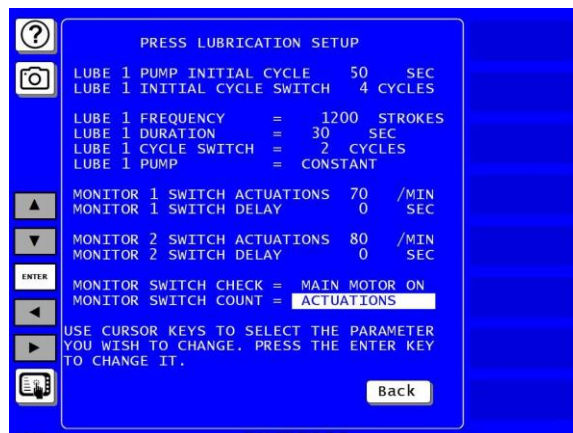
**Making ACTUATIONS Monitor 1 and Monitor 2 Lubrication Settings**

Figure 3-17. Press Lubrication Setup Screen with Monitor Switch Count Actuations



## How the ACTUATIONS Option Works

When Monitor Switch Count is set to ACTUATIONS (Figure 3-17) the system checks the number of actuations based on a 1-minute timer. Monitor Switch 1 and 2 actuations can be set from 0 to 300 per minute (default value: 20/per minute). This timer starts based on how the Monitor Switch Check is configured, i.e., MAIN MOTOR ON, DSV ON, or LUBE MOTOR IN.

Optionally, Monitor 1 and 2 “Switch Delay” can be programmed for an initial delay between 0 and 60 seconds which allows sufficient lube volume to flow through the lube system prior to monitoring. This is very useful in preventing nuisance lube faults when the press is first started. Here’s how it works:

The number of Actuations programmed into the Switch Actuations variable determine how often the Option 2 looks at the cycle switches. The minimum acceptable pulse width at the monitor inputs is 40 ms.

*Table 3-3. Actuations Check Frequency*

Number of Actuations*	Check Frequency
Less than or equal to 5	Every minute
Less than or equal to 15	Every 30 seconds
Less than or equal to 30	Every 15 seconds
Greater than or equal to 30	Every 7.5 seconds

\*1 actuation = 2 transitions of the monitor input

As an example, if the system is programmed to look at 200 actuations per minute, Option 2 starts looking at actuations after 7.5 seconds. This ensures a quick response if there is a lube problem. If after 7.5 seconds the Option 2 didn’t see 25 actuations, it generates a lube fault error.

## Making the Settings

To make ACTUATIONS Monitor 1 and Monitor 2 lubrication settings on the Press Lubrication Setup screen, set the Monitor Switch Count to ACTUATIONS (see page 55) and follow the steps below. To make INTERVAL settings, go to *Making INTERVAL Monitor 1 and Monitor 2 Lubrication Settings*, page 55.

### NOTICE

A convenient one-page lube program and setup guide is provided in *Appendix B* (see page 89).

1. Move the highlight bar to the MONITOR 1 SWITCH ACTUATIONS setting, and press ENTER. In the number entry window that displays, key in the number of actuations you want to occur per minute and press ENTER again.

### NOTICE

You can also use the Up Arrow (▲) or Down Arrow (▼) cursor key to increment or decrement the existing setting in the number entry window.

2. Move the highlight bar to the MONITOR 1 SWITCH DELAY setting and press ENTER. In the number entry window that displays, key in the number of seconds you want to allow after actuation of the device you will set (step 4) in the MONITOR SWITCH CHECK field before initiating Monitor 1 monitoring sessions. Press ENTER.
3. Repeat steps 1 and 2 for the MONITOR 2 SWITCH ACTUATIONS and MONITOR 2 SWITCH DELAY settings.

## NOTICE

To disable the Monitor 1 or Monitor 2 function, set both its values to zero (0).

4. Move the highlight bar to the MONITOR SWITCH CHECK setting, and select the device (i.e., main motor, DSV, or lube pump) you want to be used to initiate Monitor 1 and Monitor 2 sessions, pressing the ENTER key to toggle among the options.
5. Press Back to save your settings. You are returned to the View or Change Lubrication Setup menu.

## Making Speed Control Settings

Speed control settings are made on the Press Speed Setup screen (see Figure 3-19), which you access by selecting SPEED CONTROL INITIALIZATION from the Lube/Speed/Flywheel Brake Initialization menu, as shown in Figure 3-18.



Figure 3-18. Lube/Speed/Flywheel Brake Initialization Menu

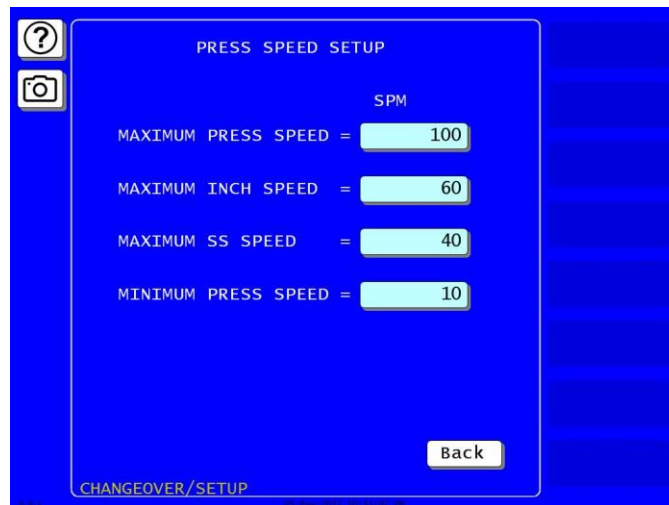


Figure 3-19. Press Speed Setup Screen

The speed parameters you set on this screen control the maximum and minimum speeds at which your press can operate in any mode and for any tool. You can also set an individual maximum press speed for Single-stroke and Inch modes. Maximum speed settings made on this screen establish the upper limit for speed settings you can make for a tool in Program mode (see Chapter 4, page 63) and for the speed adjustments you can make in Run mode (see *Adjusting Press Speed*, page 71).

Descriptions of the settings you can make on the Press Speed Setup screen are shown in Table 3-4. Procedures for setting press speed are shown following the table.

Table 3-4. Press Speed Setup Screen Settings

Setting	Description
MAXIMUM PRESS SPEED	<b>Maximum Press Speed.</b> The maximum speed of your press (i.e., the speed equivalent to the 10 VDC input to your variable speed drive). When making this setting, refer to your press or drive manufacturer's manual. SmartPAC PRO assumes a linear relationship between the 0-to-10 VDC range of the drive input and the range between 0 and the value you enter in this field. Maximum value: 2000 SPM. Minimum value: 5 SPM.
MAXIMUM INCH SPEED	<b>Maximum Press Speed in Inch Mode.</b> The maximum speed at which the press can be run for any tool in Inch mode. This value cannot be greater than the Maximum Press Speed. Maximum value: 2000 SPM.
MAXIMUM SS SPEED	<b>Maximum Press Speed in Single-stroke Mode.</b> The maximum speed at which the press can be run for any tool in Single-stroke mode. This value cannot be greater than the Maximum Press Speed. Maximum value: 2000 SPM.
MINIMUM PRESS SPEED	<b>Minimum Press Speed.</b> The minimum speed at which you want your press to be run for any tool. This value is not used for calibration but establishes a lower limit for running your press with any tool in any mode. The setting you enter in this field provides the default value for all speed settings in Program mode. Maximum value: 1999 SPM.

To set speed control initialization parameters, do the following:

1. Touch in the MAXIMUM PRESS SPEED value box. A numeric entry window opens. Key in the value for maximum speed and press ENTER.
2. Touch in the MAXIMUM INCH SPEED value box. Repeat the procedure in Step 1.
3. Touch in the MAXIMUM SS SPEED value box. Repeat the procedure in Step 1.
4. Touch in the MINIMUM PRESS SPEED value box. Repeat the procedure in Step 1.
5. Press Back to save your press speed settings. You are returned to the Lube/Speed/ Flywheel Brake Initialization menu.

You should now establish speed settings for each tool in Program mode (see page 63). Before using the press, you should check press speeds in Run mode to make sure they are accurate (see *Calibrating Speed Control Settings*, page 67). If press speeds are not accurate, you must make calibration adjustments on the motor drive control board.

## Resetting a Dual Safety Valve (DSV)

If the TOP STOP OUTPUT MODE item on the Flywheel Brake Setup screen is set to DSV RESET (see *Setting Top Stop Output Mode*, page 47), and the DSV is wired correctly to the Option 2 board (see *Wiring Top Stop Outputs*, page 32), you can reset the DSV when it is faulted by pressing DUAL VALVE RESET on the WPC Initialization Menu (see Figure 3-20). When you press DUAL VALVE RESET, a 300 ms pulse is transmitted to reset the DSV.

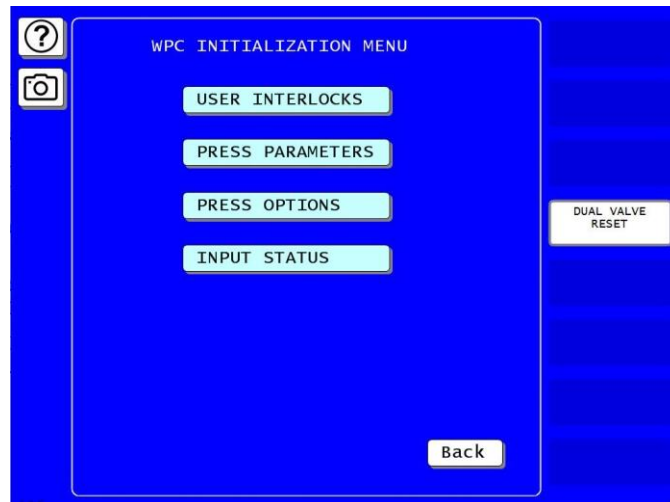


Figure 3-20. Dual Safety Valve Reset Function on WPC Initialization Menu

Two events indicate that the DSV is faulted: the press does not stroke when the Run/Inch buttons on the operator station are pressed, and an F47 fault message displays at the control (see page 82).

To reset the DSV, do the following:

1. Access the WPC Initialization Menu (select PRESS CONTROL on the SmartPAC PRO Main Initialization Menu).

2. Press DUAL VALVE RESET.

## Viewing the Status of Option 2 Inputs and Outputs

Option 2 provides a display (see Figure 3-22, page 62) on which you can view the status of inputs and outputs for hydraulic overload protection, flywheel brake control, lube control (if installed), and top-stop functions. The display allows you to view input/output status while the press is running.

Inputs displayed are those on TB603 on the Option 2 board (see Figure 2-2, page 29); outputs shown are those on TB606.

The status of user inputs wired to TB601 and TB602 is shown on the screens accessible from the Display WPC Input Status screen (see *Viewing the Status of User Inputs*, page 42).

To view the status of Option 2 inputs and outputs (for wiring connections, see Chapter 2 and Figure 2 at the end of the manual), do the following:

1. On the WPC Initialization Menu (see Figure 3-5, page 42), select INPUT STATUS. The Display WPC Input Status screen, shown in Figure 3-21, displays.

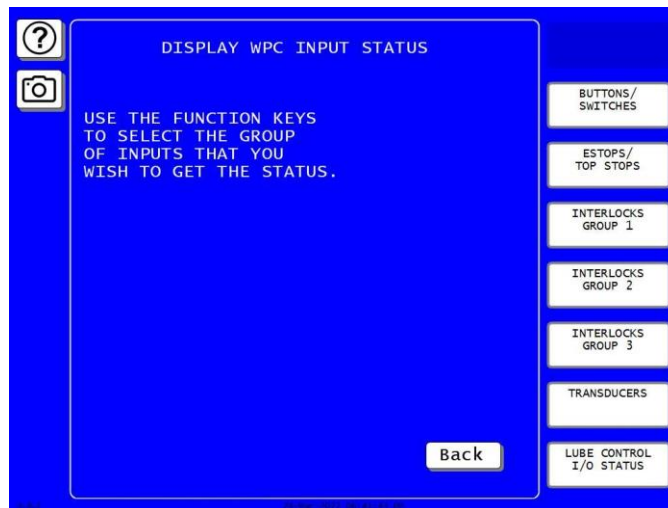
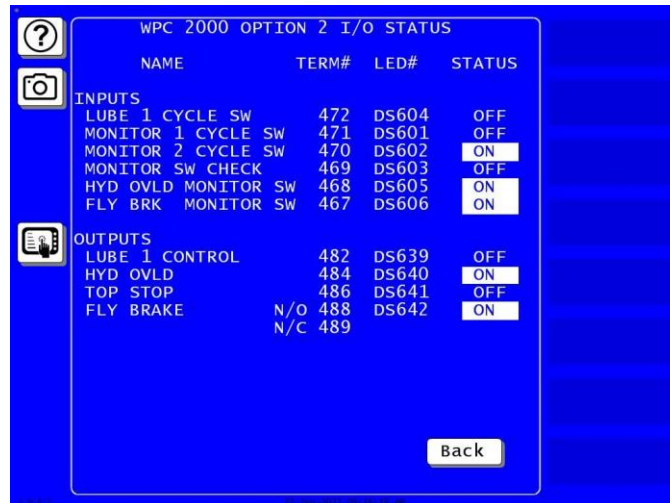


Figure 3-21. Display WPC Input Status Screen

2. Press LUBE CONTROL I/O STATUS. The WPC 2000 Option 2 I/O Status screen, shown in Figure 3-22, displays.



WPC 2000 OPTION 2 I/O STATUS				
NAME	TERM#	LED#	STATUS	
<b>INPUTS</b>				
LUBE 1 CYCLE SW	472	DS604	OFF	
MONITOR 1 CYCLE SW	471	DS601	OFF	
MONITOR 2 CYCLE SW	470	DS602	ON	
MONITOR SW CHECK	469	DS603	OFF	
HYD OVLD MONITOR SW	468	DS605	ON	
FLY BRK MONITOR SW	467	DS606	ON	
<b>OUTPUTS</b>				
LUBE 1 CONTROL	482	DS639	OFF	
HYD OVLD	484	DS640	ON	
TOP STOP	486	DS641	OFF	
FLY BRAKE	N/O	488	DS642	ON
	N/C	489		

Figure 3-22. WPC 2000 Option 2 I/O Status Screen

The status of each Option 2 input and output is shown in the rightmost column. Inputs and outputs are identified by name (first column), the terminal(s) to which they are wired (second column), and the LED with which they are associated (third column).

- To view real-time status of Option 2 inputs and outputs (e.g., lube cycle switch actuations), turn the PROG/RUN key switch to the RUN position, and start the press. The Option 2 I/O Status screen will continue to display on the SmartPAC PRO panel.

# Chapter 4 – Setting Press Speeds in Program Mode

---

Program mode is the SmartPAC PRO mode in which you program settings for each tool you install on your press. The instructions in this chapter assume that you know how to select an existing tool or create a new one and how to program and load it. If you don't know how to perform these tasks, refer to the Program mode chapter in your SmartPAC with WPC 2000 Integration user manual before attempting to use the information provided in this chapter.

In Program mode, you can set the speed for a selected tool in each of the three operating modes of the press—Continuous, Single-stroke, and Inch. When the tool is loaded, press speed will change automatically to the programmed speeds when you turn the Stroke Select key switch to a different operating mode (e.g., from Inch to Single-stroke, from Single-stroke to Continuous, etc.).

Before setting press speeds in Program mode, you should have already established maximum and minimum operating speeds and maximum single-stroke and inching speeds in Initialization mode (see *Making Speed Control Settings*, page 58).

The speeds you set in Program mode cannot exceed maximum speed settings established in Initialization Mode or be less than the minimum speed Initialization setting.

Speed settings made in Program mode can be adjusted in Run Mode (see *Adjusting Press Speed*, page 71).

## NOTICE

If you want to prevent operators from making speed adjustments in Run mode, you can set the ADJUST PRESS CNTL item on the Security Access Menu in Initialization mode to PROGRAM MODE ONLY and remove the Program/Run key from the SmartPAC PRO control(s).

If you want to limit Run mode access to specific personnel, you can set the ADJUST PRESS CNTL item on the Security Access Menu to PASSWORD REQUIRED. Refer to Chapter 3 of your SmartPAC PRO user manual for help with setting security parameters.

To program press speeds for a tool, do the following:

1. On the Main Program Menu, press TOOL MANAGER. The Tool Manager screen appears.
2. Press the tool you want to program to highlight it.
3. Press EDIT TOOL. The Tool Program Menu screen appears, Figure 4-1.

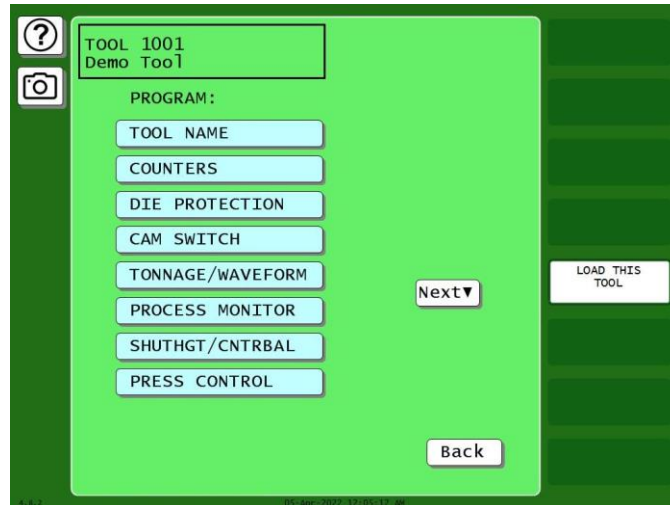


Figure 4-1. Edit Tool Program Menu

4. Press PRESS CONTROL. The Press Control Parameters screen appears, Figure 4-2. Speed settings you can make on the Press Control Parameters screen are shown in Table 4-1, below.

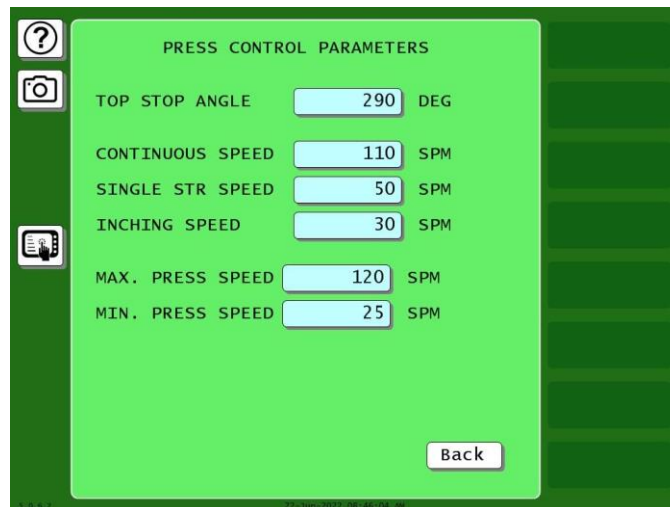


Figure 4-2. Press Control Parameters Screen



Table 4-1. Press Control Parameters Screen Settings

Setting	Description
CONTINUOUS SPEED	Press Speed in Continuous Mode. The speed at which you want the press to be run for a specified tool in Continuous operating mode. This value cannot be greater than the Maximum Press Speed or less than the Minimum Press Speed set on the Press Speed Setup screen in Initialization (see page 3-19). Default value: Minimum Press Speed.
SINGLE STROKE	Press Speed in Single-stroke Mode. The speed at which you want the press to be run for a specified tool in Single-stroke operating mode. This value cannot be greater than the Maximum SS Speed or less than the Minimum Press Speed set on the Press Speed Setup screen in Initialization. Default value: Minimum Press Speed.
INCHING SPEED	Press Speed in Inch Mode. The speed at which you want the press to be run for a specified tool in Inch mode. This value cannot be greater than the Maximum Inch Speed or less than the Minimum Press Speed set on the Press Speed Setup screen in Initialization. Default value: Minimum Press Speed.

5. Touch in the CONTINUOUS SPEED value box. A numeric entry window appears. Key in the speed value you want and press ENTER.

### NOTICE

You can also use the Up Arrow (▲) or Down Arrow (▼) to increment or decrement the existing speed setting in the number entry window.

6. Touch in the SINGLE STROKE value box. A numeric entry window appears. Key in the speed value you want and press ENTER.
7. Touch in the INCHING SPEED value box. A numeric entry window appears. Key in the speed value you want and press ENTER.
8. Press Back to save your speed settings.

Once you have programmed a tool, you must load the tool before you can run it on your press. Consult your SmartPAC PRO with WPC 2000 Integration user manual if you need help loading a tool.



# Chapter 5 – Using Option 2 in Run Mode

---

Run mode is the SmartPAC PRO mode in which you run the press. In Run mode, you can also make adjustments to some of the settings established in Program mode.

## NOTICE

SmartPAC PRO security settings may prevent changes from being made in Run mode or require a password to make changes.

The instructions in this chapter assume that you know how to get into Run mode and access the Main Run menu. If you don't know how to perform these tasks, refer to the Run mode chapter in the SmartPAC PRO with WPC 2000 user manual before attempting to use the information provided in this chapter.

In this chapter, you will learn how to

- Calibrate speed control settings
- Adjust programmed speed settings
- Monitor the current drawn by your press motor
- Operate the press in “Dead Motor Inch”

## Calibrating Speed Control Settings

After you have set press speed limits in Initialization mode (see *Making Speed Control Settings*, page 58), you should make sure that the motor drive is delivering the speeds you have set and, if it isn't, adjust the speed settings on the motor drive controller.

## NOTICE

Some drives are calibrated at the factory. If your drive has already been calibrated, there is no need to perform this procedure.

Before performing the following calibration procedure, you should have programmed speed settings for a test tool and loaded the tool (see Chapter 4, page 63). Make sure that no die is installed during calibration.

To calibrate your motor drive speed to the speeds you have set in Initialization, do the following:

1. On the Main Run Menu, Figure 5-1, press PRESS CONTROL, as shown in Figure 5-1 and press ENTER.

## NOTICE

Whenever the press is idle the display shows FSPM (flywheel strokes per minute). Once the press is started, PRESS SPEED is shown.

**NOTICE**

The FSPM value is generated from the motor drive when the clutch is not engaged. The FSPM is generated only by the Option 2, not by the flywheel sensor input.

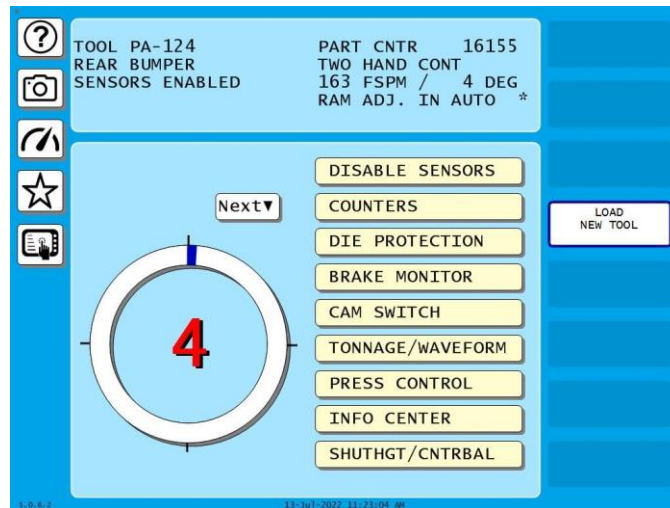


Figure 5-1. Main Run Menu

- When the Press Control Run screen displays, Figure 5-2, turn the Stroke Select key switch to CONT (i.e., Continuous).

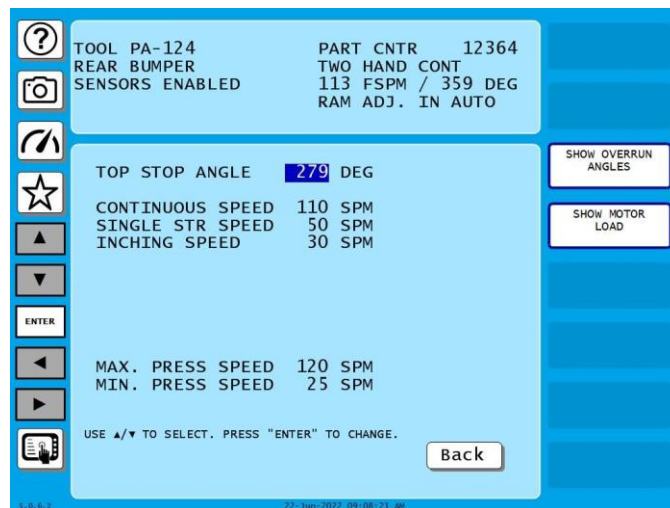


Figure 5-2. Press Control Run Screen

**NOTICE**

Whenever the press is idle the display shows FSPM (flywheel strokes per minute). Once the press is started, PRESS SPEED is shown.

**NOTICE**

The FSPM value is generated from the motor drive when the clutch is not engaged. The FSPM is generated only by the Option 2, not by the flywheel sensor input.

3. Move the highlight bar to the CONTINUOUS SPEED setting, press ENTER, and increase the displayed setting, using the Up Arrow (▲) cursor key, until the maximum press speed set in Initialization displays. Press Back to accept the value.
4. When the value in the FSPM field at the right of the Run screen header reaches approximately the maximum speed you have set, press the PRIOR ACT button on the Operator Station, then press both Run/Inch buttons to run the press in Continuous mode. (The FSPM field changes to show PRESS SPEED as measured at the resolver.)

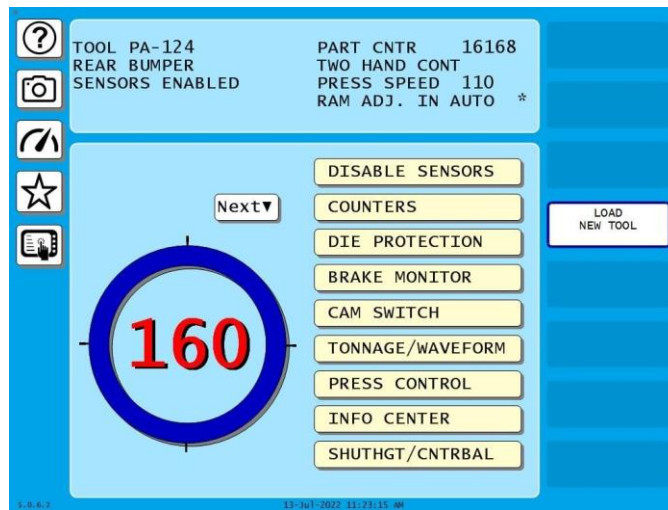


Figure 5-3. Run Screen Showing PRESS SPEED While Press Is Running

**NOTICE**

The speed displayed in the PRESS SPEED field may not reach the maximum speed value you set in step 3 or may overshoot it. You should not be concerned about this now since the FSPM setting will be adjusted later in this procedure.

5. Check the value displayed in the PRESS SPEED field on the right side of the Run screen header. This value is the press speed as measured by the resolver.

If the PRESS SPEED value does not match the CONTINUOUS SPEED setting you made in step 3, adjust the speed output parameter in the motor drive until PRESS SPEED matches CONTINUOUS SPEED.

Note the PRESS SPEED value in the Run screen shown in Figure 5-4, where the Continuous speed setting has been increased from 80 SPM (i.e., Strokes per Minute), the value set in Program mode, to 110 SPM.

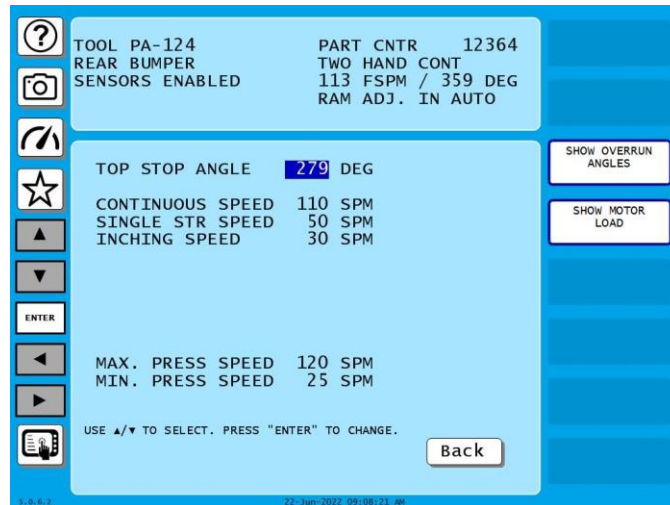


Figure 5-4. Press Control Run Screen Displaying Maximum Speed Values

6. Select the CONTINUOUS SPEED setting again, decrease the displayed setting, using the Down Arrow (▼) cursor key, until the minimum press speed set in Initialization displays. Press Back.
7. When the speed of the press has slowed to approximately the operating speed you set in step 6, observe the value displayed in the PRESS SPEED field. If the speed does not match the setting you made in step 6, you need to adjust the minimum speed on your motor drive control board.

Note the PRESS SPEED value in the Run screen shown in Figure 5-5, where the Continuous speed setting has been decreased to 100 SPM, the maximum press speed set in Initialization (see step 3), to 20 SPM, the value set for minimum press speed in Initialization mode.

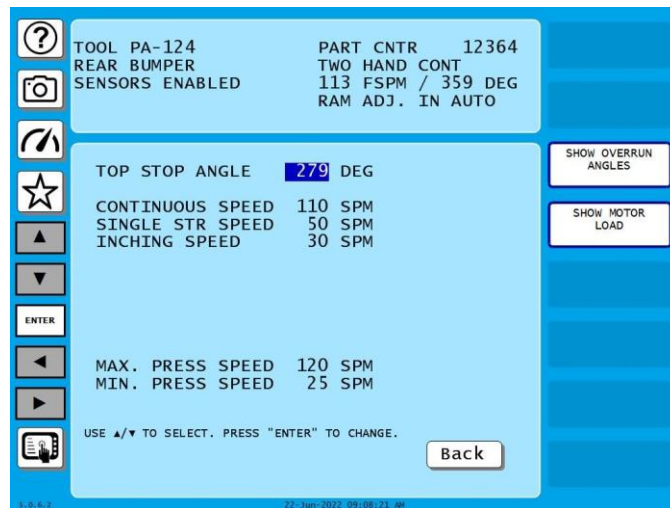


Figure 5-5. Press Control Run Screen Displaying Minimum Speed Values

8. Press the Top Stop button on the Operator Station to stop the press.
9. Readjust the CONTINUOUS SPEED setting to a value roughly in the middle of the press's programmed speed range, then press RESET.

10. Check the value displayed in the FSPM field (see Figure 5-6, below). This field, which displays on the right side of the Run screen header when the clutch is not engaged, shows the speed of the press as measured at the motor drive, which is fed to the Option 2 board via the tachometer generator output (see *Wiring Analog Speed Control Inputs and Outputs*, page 34).

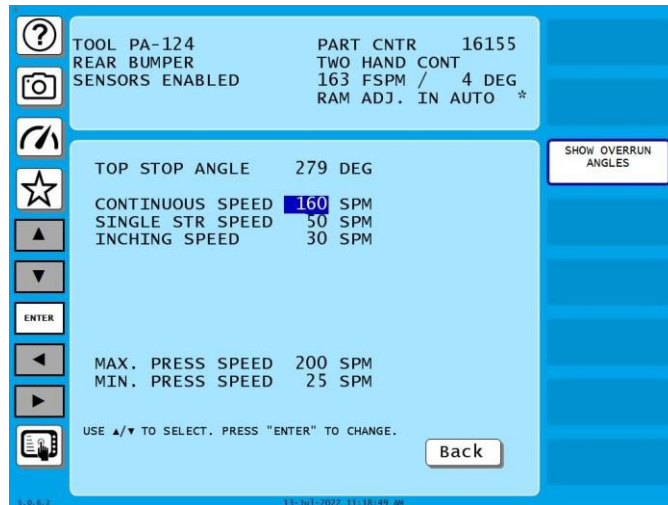


Figure 5-6. Press Control Run Screen Displaying Motor Speed

If this value does not match the setting in the CONTINUOUS SPEED field, you need to adjust the tachometer output on your motor drive control board.

Note the FSPM value of 163 in the Run screen, Figure 5-6, where the CONTINUOUS SPEED item has been set to 160 SPM.

11. Repeat steps 9 and 10 for two additional CONTINUOUS SPEED settings, using one speed value at the low end of the press's speed range, the other value at the high end of the speed range. Adjust the Tachometer Output potentiometer as necessary.

If you need help making calibration adjustments, refer to your motor drive controller manual or contact the drive manufacturer.

## Adjusting Press Speed

### NOTICE

Press speed changes can be made only incrementally in Run mode.

Because each tool has specific speed requirements, only qualified personal should be allowed to make speed changes while operating the press.

The speed settings programmed for each tool in Program mode (see page 63) can be adjusted in Run mode if the operator has the appropriate security clearance.

To adjust programmed speed settings, load the appropriate tool, then do the following:

1. On the Main Run Menu (see Figure 5-1, page 68), press PRESS CONTROL. The Press Control Run screen, shown in Figure 5-6 displays. Descriptions of the settings you can adjust on this screen are shown in Table 5-1.

Table 5-1. Press Control Run Screen Settings

Setting	Description
CONTINUOUS SPEED	Press Speed in Continuous Mode. The speed at which you want the press to be run for a specified tool in Continuous operating mode. This value cannot be greater than the Maximum Press Speed or less than the Minimum Press Speed set on the Press Speed Setup screen in Initialization (see page 58).
SINGLE STROKE	Press Speed in Single-stroke Mode. The speed at which you want the press to be run for a specified tool in Single-stroke operating mode. This value cannot be greater than the Maximum SS Speed or less than the Minimum Press Speed set on the Press Speed Setup screen in Initialization.
INCHING SPEED	Press Speed in Inch Mode. The speed at which you want the press to be run for a specified tool in Inch mode. This value cannot be greater than the Maximum Inch Speed or less than the Minimum Press Speed set on the Press Speed Setup screen in Initialization.

2. Turn the Stroke Select key switch to the operating mode in which you plan to run the press.
3. Move the highlight bar to the speed setting for the operating mode you selected in step 2, and press ENTER.
4. Press the Up Arrow (▲) cursor key to increment the speed value or the Down Arrow (▼) key to decrement the value. The speed setting increases or decreases by one unit each time you press Up Arrow (▲) or Down Arrow (▼).
5. Press Back to accept the value.

The flywheel begins to turn more rapidly or more slowly, depending on whether you have increased or decreased the speed setting, and the value shown in the FSPM field in the right half of the Run screen header increases or decreases until it reaches your adjusted setting.

## Monitoring Motor Current

If you have installed an AC motor current transducer on one of the conductors for your press motor drive and wired it to the Option 2 board (see *Installing and Wiring a Motor Current Transducer*, page 35), you can monitor the current drawn by your press motor on the Motor Load screen (see Figure 5-8). To open that screen, on the Press Control screen in Run mode, Figure 5-7, press SHOW MOTOR LOAD,



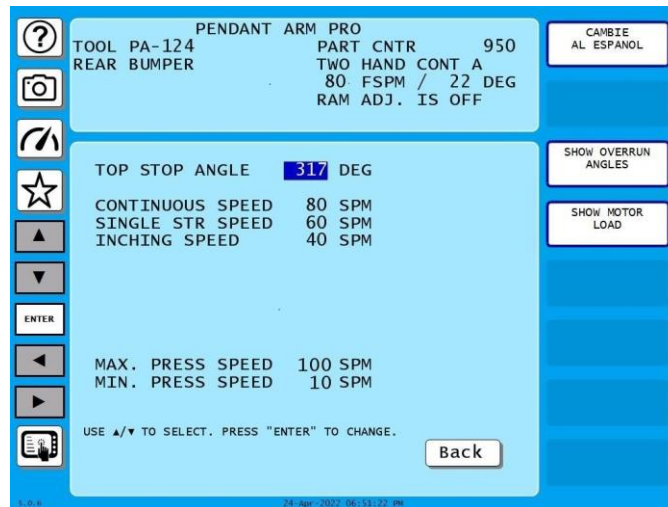


Figure 5-7. Press Control Screen in Run

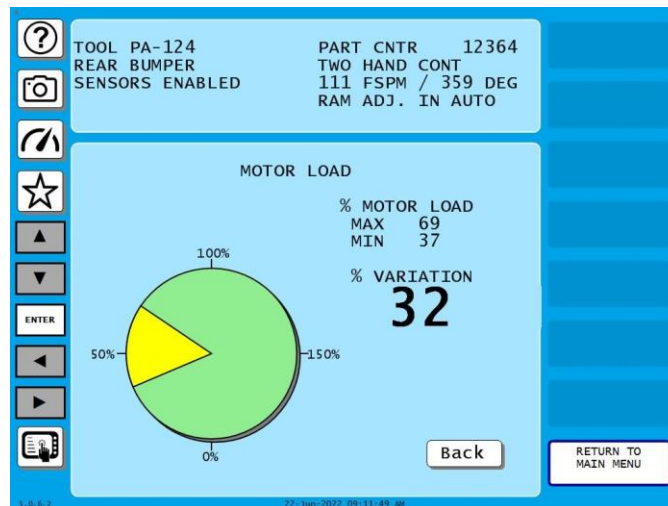


Figure 5-8. Motor Current Readings on Press Control Run Screen

Press motor current is displayed as a percentage of motor load. Maximum (MAX) and minimum (MIN) motor load percentages are shown beneath the MOTOR LOAD % caption at the right of the screen. These values are refreshed on every stroke.

Motor load percentages are calculated by dividing the motor current transducer amperage by the maximum motor current value set on the Flywheel Brake Setup screen in Initialization mode (see *Setting Maximum Transducer and Motor Current*, page 47). For example, if the amperage output by the transducer at maximum load is 28 A, and the value set for maximum motor current is 21 A, then the MAX value shown on the Press Control Run screen would be 133%.

The amount of current sensed by the transducer is influenced by two factors: the range jumper setting on the transducer (see *Wiring the Transducer*, page 35) and the maximum transducer current setting on the Flywheel Brake Setup screen. The maximum transducer current setting provides the high value in a current range that is scaled to the analog voltage output range of the transducer. For example, if the maximum amperage of the transducer is set at 50 A and the transducer's voltage output is 0 to 10

VDC, each volt output by the transducer represents 5 A of current. Returning to the example used in the previous paragraph, a 28 A transducer current reading represents 5.6 VDC of transducer output voltage.

The MAX motor load percent reading shows the maximum amount of current drawn by your motor, which will occur at some point after the tooling contacts the material to form the part and begins its upstroke, working to put energy back into the flywheel and lift the weight of the ram to the top of the press. The MIN reading shows the minimum amount of current used by the press, which will occur during the downstroke up to the point at which the die contacts the material, the weight of the ram allowing the motor to do less work. The MAX and MIN values displayed on the Press Control Run screen should be relatively close for optimal counterbalance adjustment. If the two values are far apart, your press is probably working too hard on its upstroke and the ram counterbalance pressure needs to be increased.

## Operating the Press in “Dead Motor Inch”

If the DEAD MOTOR INCH item on the Flywheel Brake Setup screen in Initialization mode has been enabled (see *Enabling the “Dead Motor Inch” Feature*, page 46), the operator can run the press in Inch mode for a brief time after the press motor has been turned off until all the energy stored in the flywheel is used up. When “Dead Motor Inch” is enabled, the flywheel brake is not applied when the press motor is turned off as long as the Stroke Select key switch is in the INCH position. To keep the press in Dead Motor Inch and prevent the flywheel brake from being activated, the operator must press the Run/Inch buttons on the operator station at least once every fifteen seconds after the press motor has been shut down.

Dead Motor Inch allows the press to be Inched in smaller increments than is possible when the press is running.

# Chapter 6 – Troubleshooting

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This chapter shows you how to interpret and correct Option 2 fault messages. When a fault occurs, the associated message, identified by fault code, appears on your SmartPAC PRO display or in the error log. (If you need help using the error log, refer to the error message chapter in your SmartPAC PRO with WPC 2000 user manual.)

When an error occurs, a red message window like the one shown in Figure 6-1 is displayed. The error windows indicate the exact nature of the error and provide a brief explanation.



*Figure 6-1. Error Code Message*

To clear the fault message, press OK. Then correct the malfunction, referring to documentation of the appropriate fault in this chapter. When the problem has been corrected, you can resume operation.

## General Faults

### **F148 OPTION BOARD NOT CORRECT**

The previously installed option board was not present when the system powered up.

#### **Problem:**

This message displays when either Option 2 firmware has been upgraded and power has not been cycled twice or the Option 2 board has been removed from the WPC 2000 board or is not seated properly.

#### **Remedy:**

If you get this message after upgrading Option 2 firmware, cycle power twice to the SmartPAC PRO control.

If you haven't upgraded firmware and the Option 2 board is installed, make sure that the board is seated firmly and that the screws securing it to the WPC 2000 board are tight. If the Option 2 board has been removed, WPC 2000 must be re-initialized and power cycled to the SmartPAC PRO control.

### **NOTICE**

Removal of the Option 2 board should be performed only after careful consideration of safety implications. If you have wired and programmed cross-checked user inputs on the Option 2 board, removal of the board could render press operation hazardous.

**NOTICE**

When you re-initialize WPC 2000, all press control parameters (e.g., option switch settings, brake monitor settings, etc.) are reset to their default values. To avoid losing data you have painstakingly entered, copy existing press control parameters to a table so you can replace them when WPC 2000 is re-initialized.

To re-initialize WPC 2000, put the SmartPAC PRO into Initialization mode, then select, in succession, PRESS CONTROL on the Main Initialization Menu, PRESS PARAMETERS on the WPC Initialization Menu, and, finally, INITIALIZE PARAMETERS on the Press Control Parameter Menu.

**F149****Problem:**

A fault has occurred with a WPC 2000 Option board. This is a global fault code. It appears only if the WPC 2000 has a remote display board.

When this fault occurs, the SmartPAC PRO or SmartPAC 2 automatically decodes the error and shows the appropriate fault number (F150 – F163) on its display.

**Remedy:**

Refer to the remedy for the fault number shown on the SmartPAC 2 or SmartPAC PRO display.

**F157 CAN COMMS FAILURE**

Lost CAN bus communications with option 2 board.

**Problem:**

One or both of the CAN bus connections to the Option 2 board (TB605) and WPC 2000 board (TB108) are bad, causing loss of communications between the two boards.

**Remedy:**

Check the 3-pin (TB605) and 5-pin (TB108) plugs on the CAN bus (see Figure 2-2, page 29 and Table 2-1, page 25) to make sure they are seated firmly in their connector sockets. If either connection appears to be loose, remove and reinsert the plug. If the plugs are firmly seated, check the wiring at the individual pins to make sure the wires are screwed down tightly.

**F159 OPTION BOARD DISAGREEMENT**

Processors A & B disagree over the presence of the option 2 board.

**Problem:**

One or both of the connectors underneath the Option 2 board are not seated properly or one or both of the connectors are bad.

**Remedy:**

Try reinstalling the Option 2 board (see *Installing the Option 2 Board*, page 23), making sure to seat both connectors accurately, then power down and power up the SmartPAC PRO. If you still get the F159 fault, one or both of the connectors are bad. Contact Wintriss Tech. Support for assistance.

**F160 OPTION BOARD ID ERROR**

The current option board firmware is not supported by the current WPC firmware version.

**Problem:**

The current WPC 2000 firmware is too old to recognize the Option Board ID.

**Remedy:**

Updating the WPC 2000 firmware will solve this problem.

**F163 OPTION BOARD VERSION ERROR**

The installed option board firmware is not supported by the current WPC firmware version.

**Problem:**

The current WPC 2000 firmware is too old to recognize the Option Board firmware.

**Remedy:**

Updating the WPC 2000 firmware will solve this problem. You may be able to change to an earlier version of Option 2 FW and get the system to work.

**A MULTIPAC OR WPC LUBE CONTROL WAS INSTALLED THE LAST TIME THE UNIT WAS POWERED-UP AND WAS NOT SEEN THIS TIME.**

If this is OK then press the clear key to remove it from the list. To try to connect again press the enter key. If this is not OK or you cannot get connected then you must not operate the press until the problem has been fixed.

### **Problem:**

This fault, which occurs at power-up, indicates either that a previously installed MultiPAC board has been removed and replaced by an Option 2 board or that a previously installed MultiPAC or Option 2 board has been removed.

### **Remedy:**

If you have replaced a MultiPAC board with an Option 2 board, press ENTER. If a MultiPAC or Option 2 board has been removed, press CLEAR.

## **User Input Faults**

Table 6-1, below, shows the fault code associated with each Option 2 user input that appears on your SmartPAC PRO display when there is a problem with the auxiliary equipment to which that input is connected.

To correct the problem that caused the fault code to display, check the equipment and wiring connected to that user input. When you have corrected the problem, reset the system. If the problem recurs, contact Wintriss Tech. Support.

*Table 6-1. WPC 2000 Option 2 User Input Fault Codes*

<b>Fault Code</b>	<b>User Input</b>	<b>Pin #</b>	<b>Terminal for jumper connection</b>
120	User 12	433	Ground
121	User 13	434	Ground
122	User 14	435	Ground
123	User 15	436	Ground
124	User 16	440	Ground
125	User 17	441	Ground
126	User 18	442	Ground
127	User 19	443	Ground
128	User 20	444	Ground
129	User 21	445	Ground

Fault Code	User Input	Pin #	Terminal for jumper connection
130	User 22	448	+24 VDC
131	User 23	449	+24 VDC
132	User 24	450	+24 VDC
133	User 25	451	+24 VDC
134	User 26	455	+24 VDC
135	User 27	456	+24 VDC
136	User 28	457	+24 VDC
137	User 29	458	+24 VDC
138	User 30	459	+24 VDC
139	User 31	460	+24 VDC
140, 144	User 32 paired with User 33	431	+24 VDC
		438	+24 VDC
141, 145	User 34 paired with User 35	432	+24 VDC
		439	+24 VDC
142, 146	User 36 paired with User 37	452	+24 VDC
		461	+24 VDC
143, 147	User 38 paired with User 39	453	+24 VDC
		462	+24 VDC

## Hydraulic Overload Faults

### F153 HYDRAULIC O/L FAULT

The hydraulic overload pressure switch has opened. You must INCH the press to the top of the stroke. The system must repressurize to close the switch. Check reason for overload before normal operation.

#### Problem:

The normally closed hydraulic overload switch, which is wired to pin #468 on TB603 on the Option 2 board, has opened during operation of the press, indicating that a hydraulic overload has occurred. The press has been emergency-stopped.

This message may also display when the press does not have a hydraulic overload system and pin #468 on TB603 has not been jumpered to ground.

**Remedy:**

Turn the Stroke Select key switch to INCH. When a second F153 message displays, press OK, then try stroking the press. If additional F153 or F155 (see below) messages display, keep pressing OK and trying to stroke the press. If the F154 message displays, follow the directions provided in the Remedy for the F154 fault (see next item); otherwise, continue “inching” the press forward to the top of its stroke.

The hydraulic overload pump should turn on when the ram reaches 270° and begin repressurizing the system. The STATUS setting for the Hydraulic Overload output on the Option 2 I/O Status screen (see *Viewing the Status of Option 2 Inputs and Outputs*, page 61) should change from OFF to ON when the pump turns on. The STATUS setting for the Hydraulic Overload Monitor Switch input should change from OFF to ON when the system has been repressurized.

**NOTICE**

You can also check the state of the pump by observing LED DS640 on the Option 2 board (see Figure 2-3, page 37). When the system has been repressurized, LED 2 in Group 12 will light.

If your press does not have a hydraulic overload system, make sure that pin #468 on TB603 is jumpered to ground (see Figure 2-2, page 29).

**F154 HYDRAULIC O/L FAULT**

The hydraulic overload pressure switch is open. The ram is before BDC. If possible REVERSE the MOTOR and INCH to the top of the stroke. The system must repressurize to close the switch.

**Problem:**

The normally closed hydraulic overload switch, which is wired to pin #468 on TB603 on the Option 2 board, has opened during operation of the press, indicating that a hydraulic overload has occurred. The press has been emergency-stopped before bottom dead center (BDC).

This message displays after you have changed the operating mode of the press to Inch and pressed OK following display of fault F153. You may also see fault F155 (see below) before this message displays.

**Remedy:**

Press OK. Stop the main motor, then restart the motor in reverse, and inch the press to the top of the stroke.

**NOTICE**

If you cannot reverse the motor at the control, contact your plant electrician for instructions.

The hydraulic overload pump should turn on some time after the ram reaches 30° and begin repressurizing the system. The STATUS setting for the Hydraulic Overload output on the Option 2 I/O Status screen (see *Viewing the Status of Option 2 Inputs and Outputs*, page 61) should change



from OFF to ON when the pump turns on. The STATUS setting for the Hydraulic Overload Monitor Switch input should change from OFF to ON when the system has been repressurized.

## NOTICE

You can also check the state of the pump by observing LED DS640 on the Option 2 board (see Figure 2-3, page 37). When the system has been repressurized, LED 2 in Group 12 will light.

### F155 HYDRAULIC O/L FAULT

The hydraulic overload pressure switch is still open. The system must repressurize, in order to close the pressure switch. Check reason for overload before returning to normal operation.

#### Problem:

You are attempting to restart the press while the hydraulic overload pressure switch is open. The press cannot be restarted until the hydraulic overload pump has repressurized the hydraulic overload system and the hydraulic overload pressure switch has closed.

#### Remedy:

Before attempting to restart the press, check the setting in the STATUS field for the Hydraulic Overload Monitor Switch input on the Option 2 I/O Status screen (see *Viewing the Status of Option 2 Inputs and Outputs*, page 61). When the hydraulic overload system has been repressurized, the setting should change from OFF to ON.

## NOTICE

You can also determine when the hydraulic overload system has been repressurized by observing LED 2 in Group 12 on the Option 2 board (see Figure 2-3, page 37), which illuminates when the hydraulic pressure switch closes.

### F161 HYDRAULIC O/L WRONG STATE

The overload pressure switch has closed before the pump energized. Select INCH mode and bring the ram to the top of the stroke to repressurize.

#### Problem:

The hydraulic overload pressure switch has closed before a hydraulic overload condition could be cleared, and the hydraulic overload pump cannot be restarted. Normally, the pressure switch remains open after a hydraulic overload fault until the hydraulic overload pump has turned on and repressurized the system.

**Remedy:**

Inch the press to the top of the stroke. The hydraulic overload pump should turn on when the ram reaches either 270° or 30° and begin repressurizing the system. The STATUS setting for the Hydraulic Overload output on the Option 2 I/O Status screen (see *Viewing the Status of Option 2 Inputs and Outputs*, page 61) should change from OFF to ON when the pump turns on. The STATUS setting for the Hydraulic Overload Monitor Switch input should change from OFF to ON when the system has been repressurized.

**NOTICE**

You can also check the state of the pump by observing LED DS640 on the Option 2 board (Figure 2-3, page 37). When the system has been repressurized, LED 2 in Group 12 will light.

## Flywheel Brake Faults

**F156 FLYWHEEL BRAKE FAULT**

The flywheel brake did not work as expected. Check the brake system monitoring switch connections.

**Problem:**

The flywheel brake did not disengage when the main motor was turned on. The brake should disengage whenever power is applied to the flywheel.

**Remedy:**

Check the pressure switch that controls operation of the flywheel brake.

## DSV Faults

**F47 DSV MONITOR FAULT**

The check contacts is the DSV have opened. Check the DSV to insure that it's safe to operate the press.

**Problem:**

The Dual Safety Valve (DSV) input switch is open, and the DSV is faulted.

**Remedy:**

To reset the DSV press DUAL VALVE RESET on the WPC Initialization Menu (see *Resetting a Dual Safety Valve (DSV)*, page 60).

## Lube Faults

### F150 LUBE 1 FAULT

A lube control fault has occurred. The lubricant is not being properly circulated or there is a cycle switch failure.

#### Problem:

The Lube 1 input has not received the number of cycle switch actuations programmed for the lubrication time specified in Initialization for either an initial or regular Lube 1 lube session.

#### Remedy:

If this is a new installation, check the status of the Lube 1 Cycle Switch input on the Option 2 I/O Status screen (see *Viewing the Status of Option 2 Inputs and Outputs*, page 61). The STATUS entry for LUBE 1 CYCLE SW should toggle from OFF to ON as the cycle switch on the divider valve opens and closes. If the STATUS setting does not change (i.e., remains continuously OFF or ON), check the wiring of the cycle switch.

### NOTICE

You can also check whether the cycle switch is working by observing the LED associated with the Lube 1 input (LED 6 in Group 12—see Figure 2-3, page 37). The LED should blink off and on if the cycle switch is operating properly.

If the cycle switch is working and the press has just been started, you may have programmed too many cycle switch actuations for the specified lubrication time in SmartPAC PRO Initialization. Try decreasing the cycle switch actuations or increasing the lube time. Refer to *Making Lube Control Settings*, page 48.

If this message displays after the machine has been running for some time, check to make sure that the lube system has sufficient oil in the reservoir and that no lube lines have become crimped or unattached. Also check the wiring from the cycle switch to the Lube 1 input on the Option 2 board (see *Wiring Lube Control Inputs and Outputs*, page 32).

### F151 MONITOR 1 SW FAULT

A lube control fault has occurred. The lube cycle monitor switch 1 has detected a problem.

#### Problem:

The Monitor 1 input has not received the number of cycle switch actuations programmed for the lubrication time specified in Initialization for a Monitor 1 lube session.

**Remedy:**

If this is a new installation, check the status of the Monitor 1 Cycle Switch input on the Option 2 I/O Status screen (see *Viewing the Status of Option 2 Inputs and Outputs*, page 61). The STATUS entry for MONITOR 1 CYCLE SW should toggle from OFF to ON as the cycle switch on the divider valve opens and closes. If the STATUS setting does not change (i.e., remains continuously OFF or ON), check the wiring of the cycle switch.

**NOTICE**

You can also check whether the cycle switch is working by observing the LED associated with the Monitor 1 input (LED 5 in Group 12—see Figure 2-3, page 2-15). The LED should blink off and on if the cycle switch is operating properly.

If the cycle switch is working and the press has just been started, the Monitor 1 lubrication monitoring window set in SmartPAC PRO Initialization may be too long. Try increasing the lube monitoring time. Refer to *Making Lube Control Settings*, page 48.

If this message displays after the machine has been running for some time, check to make sure that the lube system has sufficient oil in the reservoir and that no lube lines have become crimped or unattached. Also check the wiring from the cycle switch to the Monitor 1 input on the Option 2 board (see *Wiring Lube Control Inputs and Outputs*, page 32).

**F152 MONITOR 2 SW FAULT**

A lube control fault has occurred. The lube cycle monitor switch 2 has detected a problem.

**Problem:**

The Monitor 2 input has not received the number of cycle switch actuations programmed for the lubrication time specified in Initialization for a Monitor 2 lube session.

**Remedy:**

If this is a new installation, check the status of the Monitor 2 Cycle Switch input on the Option 2 I/O Status screen (see *Viewing the Status of Option 2 Inputs and Outputs*, page 61). The STATUS entry for MONITOR 2 CYCLE SW should toggle from OFF to ON as the cycle switch on the divider valve opens and closes. If the STATUS setting does not change (i.e., remains continuously OFF or ON), check the wiring of the cycle switch.

**NOTICE**

You can also check whether the cycle switch is working by observing the LED associated with the Monitor 2 input (LED 4 in Group 12—see Figure 2-3, page 37). The LED should blink off and on if the cycle switch is operating properly.

If the cycle switch is working and the press has just been started, the Monitor 2 lubrication monitoring window set in SmartPAC PRO Initialization may be too long. Try increasing the lube monitoring time. Refer to *Making Lube Control Settings*, page 48.

If this message displays after the machine has been running for some time, check to make sure that the lube system has sufficient oil in the reservoir and that no lube lines have become crimped or unattached. Also check the wiring from the cycle switch to the Monitor 2 input on the Option 2 board (see *Wiring Lube Control Inputs and Outputs*, page 32).

**F162 LUBE MOTOR FAULT**

A lube control fault has occurred. The lube motor was off when the main motor was turned on. Check the wiring or the setting of Monitor Switch Check in lube setup window.

**Problem:**

The LUBE MOTOR IN setting is enabled in the MONITOR SWITCH CHECK field on the Press Lubrication Setup screen, but no input is wired to pin #469 (LUBE MOTOR ON) on TB603 on the Option 2 board, or the input wiring connection is loose.

**Remedy:**

If you are not using a lube motor input signal to initiate Monitor 1 and 2 lube cycles, change the setting in the MONITOR SWITCH CHECK field on the Press Lubrication Setup screen to either MAIN MOTOR ON or DSV ON (see *Setting Monitor 1 and 2 Initialization Parameters*, page 54). If you are using a lube motor input signal, check the wiring at pin #469 (see Figure 2-2, page 29).

## Speed Control Faults

**F158 TACH FAULT**

A tachometer reading fault has occurred. The tach input is set to 4-20 mA and the reading is too low or the current loop is open. Check the wiring.

**Problem:**

Either there is a loose wiring connection or no power at the tachometer generator terminals of the motor drive, or jumpers JP601A and JP601B on the Option 2 board are set to the wrong position (i.e., jumpers are set to the “4-20 mA” position, but the tachometer generator output supplies a 0-10 VDC signal and is wired to the 4-20 mA terminals, pins #475 and #476, on TB604 on the Option 2 board).

**Remedy:**

If this is a new installation, check the wiring at TB604 and the jumper settings at JP601A and JP601B. If wiring and settings are for a 4-20 mA signal, rewire the tachometer generator connections for 0-10 VDC (i.e., to pins #476 and #477 on the Option 2 board) and reset jumpers JP601A and JP601B to the “0-10 V” position (see Figure 2-2, page 29). If wiring and settings are for a 0-10 VDC signal, check the tachometer generator terminals on the motor drive for a loose wiring connection or no power.

If the press has been in operation for a while, first check the wiring connections and power at the tachometer generator terminals, then, if these are OK, check TB604 wiring and jumper JP601A and JP601B settings.

# Appendix A – Option 2 User Input Setup Sheet

User Input	Fault Code	Stop Type	Pin #	Terminal for jumper connection	Name of Auxiliary Equipment (see step 5, page 41)
User 12	120		433	Ground	
User 13	121		434	Ground	
User 14	122		435	Ground	
User 15	123		436	Ground	
User 16	124		440	Ground	
User 17	125		441	Ground	
User 18	126		442	Ground	
User 19	127		443	Ground	
User 20	128		444	Ground	
User 21	129		445	Ground	
User 22	130		448	+24 VDC	
User 23	131		449	+24 VDC	
User 24	132		450	+24 VDC	
User 25	133		451	+24 VDC	
User 26	134		455	+24 VDC	
User 27	135		456	+24 VDC	
User 28	136		457	+24 VDC	
User 29	137		458	+24 VDC	
User 30	138		459	+24 VDC	
User 31	139		460	+24 VDC	
User 32 paired with User 33	140, 144		431	+24 VDC	
			438	+24 VDC	
User 34 paired with User 35	141, 145		432	+24 VDC	
			439	+24 VDC	
User 36 paired with User 37	142, 146		452	+24 VDC	
			461	+24 VDC	
User 38 paired with User 39	143, 147		453	+24 VDC	
			462	+24 VDC	





# Appendix B – Lube Control Setup Guide

The fields you can enter on the Press Lubrication Setup Screen are identified by number in Figure B - 1. Following the figure, numbered instructions, keyed to field identification numbers, are provided to help you enter the correct information in each field. Use of the Back key (item #13 in Figure B-1) is also documented.

**PRESS LUBRICATION SETUP**

LUBE 1 PUMP INITIAL CYCLE      ① →       SEC

LUBE 1 INITIAL CYCLE SWITCH    ② →       CYCLES

LUBE 1 FREQUENCY                = ③ →     ④ →

LUBE 1 DURATION                 = ⑤ →       SEC

LUBE 1 CYCLE SWITCH            = ⑥ →       CYCLES

LUBE 1 PUMP                        =                ⑦ →

MONITOR 1 SWITCH ACTUATIONS ⑧ →

MONITOR 1 SWITCH DELAY        ⑨ →       SEC

MONITOR 2 SWITCH ACTUATIONS ⑩ →

MONITOR 2 SWITCH DELAY        ⑪ →       SEC

MONITOR SWITCH CHECK = ⑫ →

MONITOR SWITCH COUNT = ⑬ →

USE CURSOR KEYS TO SELECT THE PARAMETER  
YOU WISH TO CHANGE. PRESS ENTER TO CHANGE IT.

⑭ → PRESS Back WHEN DONE.

Figure B - 1. Press Lubrication Setup Screen with Fields Identified

1. **LUBE 1 PUMP INITIAL CYCLE:** When you enter a value in this field (valid entries are 1-400 seconds), the Lube 1 lube control valve or other device is actuated each time the main power is turned on. The device runs for the length of time you specify. The Lube 1 Initial Cycle function is useful for lubricating counterbalance cylinders, which may need an initial coating of lubricant before the press motor is started.

2. **LUBE 1 INITIAL CYCLE SWITCH:** Enter the number of cycle switch actuations (1-100) that must occur within the time specified in field 1 to prevent generation of a lube fault.
3. **LUBE 1 FREQUENCY:** Enter the number of minutes or strokes (1-4000) that you want to elapse between actuations of the lube control valve or other device during regular lubrication sessions. Since actuation of the press motor triggers operation of the lubrication device, this value also determines the interval between press motor actuation and the beginning of the first lube cycle.
4. **LUBE 1 FREQUENCY:** Specify the unit of measurement (i.e., minutes or strokes) for the value you entered in field 3. To change from STROKES to MINUTES, use the Left Arrow (◀) or Right Arrow (▶) cursor key on your SmartPAC PRO panel.
5. **LUBE 1 DURATION:** Enter the number of seconds (0-250) that you want the lube control valve or other device to run.
6. **LUBE 1 CYCLE SWITCH:** Enter the number of cycle switch actuations (0-100) that must occur within the time specified in field 5 to prevent generation of a lube fault.
7. **LUBE 1 PUMP:** Specify how you want the pump or other device to dispense lubricant (i.e., in a constant stream or in pulses). Use the ENTER key on your SmartPAC PRO panel to toggle between CONSTANT and PULSED settings. With this field set to PULSED, the lubrication device dispenses lubricant at 3-second intervals. The CONSTANT setting is recommended for most re-flow lube systems.
8. **MONITOR 1 SWITCH INTERVAL:** Enter the number of seconds (0-200) within which one cycle switch actuation must occur to prevent generation of a lube fault. The Monitor 1 lube system is ideal for monitoring the main lube system pump.
9. **MONITOR 1 SWITCH DELAY:** Enter a value in seconds (0-30) if you want to program a delay between actuation of the press motor and the beginning of Monitor 1 cycle switch monitoring. Use of a delay is ideal at press startup, compensating for the time it takes lubrication to work through the lube lines.
10. **MONITOR 2 SWITCH INTERVAL:** Enter a value as in field 8 for the length of the monitoring window. The Monitor 2 function allows you to monitor another lube system.
11. **MONITOR 2 SWITCH DELAY:** Enter a value as in field 9 if you want to program a delay in the Monitor 2 system.
12. **MONITOR SWITCH CHECK:** Specify the device you want used to trigger Monitor 1 and Monitor 2 monitoring sessions (i.e., main motor, DSV, or lube pump). Use the ENTER key to toggle between MAIN MOTOR ON, DSV ON, and LUBE PUMP IN settings. The lube pump specified in the LUBE PUMP IN setting is the device wired to pin #469 on TB606 on the Option 2 board. If you have specified a delay in field 9 or 11, monitoring will begin that number of seconds after actuation of the device you select in this field.
13. **MONITOR SWITCH COUNT:** Specify INTERVAL and ACTUATIONS. Press ENTER to toggle between the choices.
14. **Back button:** You must press Back to save the lube control settings you have entered.

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