OmniLink II Press Automation Control Automatic Setup Module

OPERATING MANUAL
Version 1.1

OmniLink II

LINK ELECTRIC & SAFETY CONTROL COMPANY
444 McNALLY DRIVE, NASHVILLE TN 37211
PH (615)-833-4168 FAX (615)-834-1984

TABLE OF CONTENTS

Section 1 Introduction

The 5100-10 Automatic Setup Module allows the OmniLink II Press Automation Control to automatically adjust press shut height, counterbalance air pressure and cushion air pressure when jobs are recalled from memory. It consists of a base 5100-10 microprocessor board that connects to the OmniLink II Press Automation Control system, and additional boards that may be mounted on the base board to provide pressure or shut height adjustment functions. Each 5100-10 module can control; one slide adjust system and two air systems, four air systems, or two slide adjust systems. Up to four 5000-10 Automatic Setup Modules can be connected to an OmniLink II Press Automation Control System.

Section 1.1 Counterbalance Control

The proper setup of the air counterbalance system in a press is often thought of as a relatively unimportant detail. In fact, the counterbalance performs a very critical function. By countering the weight of the slide and its associated tooling a properly adjusted counterbalance:

- Takes up bearing clearances before the die closes at the bottom of the stroke, reducing bearing load and impact.
- Helps reduce gear tooth impact in geared machines by maintaining drive edge gear tooth contact in the press downstroke.
- Decreases the downstroke stopping time of the press since less load is seen by the brake in the downstroke.
- Enhances safety by reducing the possibility that the slide will free fall, if the brake is released and the clutch is not engaged.
- Causes less total energy to be used by the press.
- Increases drive motor life by reducing peak motor currents.

None of the foregoing advantages will be realized if the counterbalance pressure is set too low. But a counterbalance pressure that is set too high is also detrimental to the press, causing excessive clutch wear and loss of flywheel energy in the downstroke before the dies contact material.

By setting the pressure automatically when a job is recalled, the OmniLink II Press Automation Control Automatic Setup module assures that the pressure is correct for the tooling used. This not only reduces machine maintenance, but also increases safety and speeds up job setup tremendously. In addition, the Automatic Setup module sets the correct pressure for each die, rather than an approximate pressure for a range of die weights from tables provided with manually adjustable counterbalance systems.

Section 1.2 Cushion Control

Quick die change is becoming increasingly important to maintaining a competitive edge. By controlling cushions pressure automatically, the Automatic Setup module can shorten die change and assure a correct setup in the least amount of time.

Section 1.3 Shut Height Control

When a shut height control module is provided, the Automatic Setup module can provide accurate and repeatable shut height adjustment on presses that are in reasonable mechanical condition, enhancing parts quality and reducing setup time. This system uses the existing slide motor starter.

Section 2 Parameter Entry and Access Control

Section 2.1 Parameter Entry

Throughout the OmniLink II Press Automation control, a fairly standard form of data entry is employed. When data entry is allowed, an "editing cursor" will appear on the screen. This cursor can typically be moved from parameter to parameter on the screen with the up, down, left, and right arrow keys. The topmost softkey is used to select the parameter for editing and can change description depending on the parameter selected.

Section 2.1.1 Numeric Entries

Assuming access has been achieved by one of the means listed in the following sections, to change a numeric value:

a) Place the editing cursor on the parameter to be changed by using the up, down, left, and right arrow keys as appropriate. Note that the editing cursor will only appear on the screen when editing is allowed. For instance, editing is usually not allowed when the press is running.

b) The topmost softkey will usually say something along the lines of "CHANGE XXXXXX" where XXXXXX is the name of the value to be changed. It may also simply say "CHANGE NUMBER." In any case, hit this softkey to enter numeric input mode. The editing cursor will change to a rectangle around the parameter to be edited.

c) Use the numeric keypad to input the new number desired for the parameter.

d) Press the ENT key to finish.

Note that moving off the parameter with the arrow keys or hitting the EXIT key will abort the edit and leave the parameter at the value it had before the editing process began.

Section 2.1.2 Text Entry

For text entry:

a) Place the editing cursor on the text to be changed by using the up, down, left, and right arrow keys as appropriate. Note that the editing cursor will only appear on the screen when editing is allowed. For instance, editing is usually not allowed when the press is running.

b) The topmost softkey will usually say something along the lines of "CHANGE XXXXXX" where XXXXXX is the name of the value to be changed. It may also simply

say “CHANGE TEXT” or “CHANGE DESC.” In any case, hit this softkey to enter text entry mode. The right-hand softkeys will change, a letter selection box will appear, and the editing cursor will change to a rectangle around the text to be edited. Figure 2.1 shows the softkeys and an example text parameter.

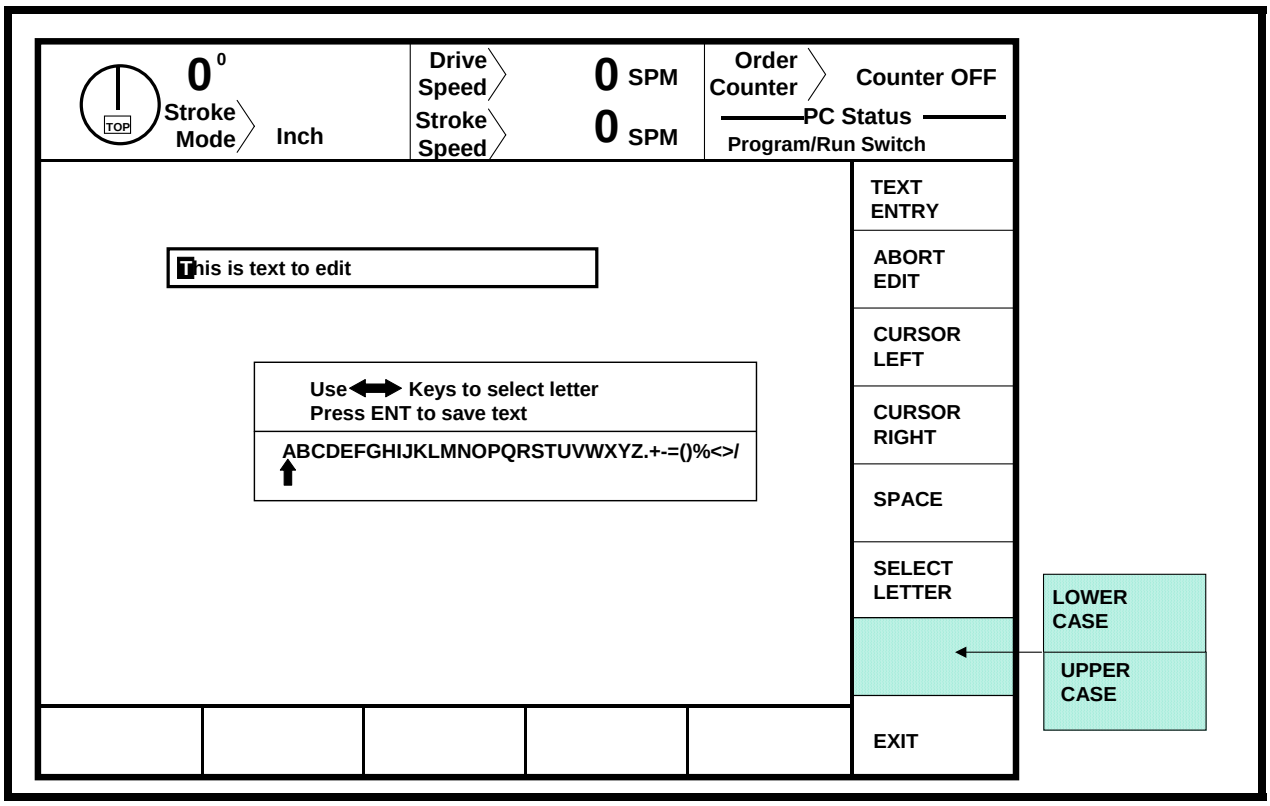

Figure 2-1 Example Text Entry

c) The fist character of the text is highlighted with the text cursor. The CURSOR LEFT and CURSOR RIGHT softkeys will move this cursor.

d) Use the left and right arrow keys to point to the letter desired in the letter box next to the text being edited. This box will just appear above or just below the text to be edited depending on where it is in the screen. Hit the SELECT LETTER softkey to place that letter at the text cursor. In the example above, the text cursor is on the “T” in “This” and would be replaced with an “A”. The text cursor will automatically move to the right when a letter is selected. Note that numerals can be entered directly with the numeric keypad.

e) The SPACE softkey can be used to enter a space character in the text.

f) The softkey immediately above the EXIT softkey is used to select between uppercase and lowercase letters.

g) The EXIT or ABORT EDIT softkeys can be used to abort the editing operation. The text will revert to what it was before the editing operation started.

h) After the text has been changed as desired, press the ENT key to accept the changes.

Section 2.2 Access Control

The OmniLink control has several parameters or operations that have limited access. In regards to the auto setup module the ability to perform the actions of resetting faults or changing limits must be restricted to certain personnel. The OmniLink control provides several means to limit access to these parameters or operations. These parameters and operations are called restricted items. See the OmniLink II Press Automation Control Operating Manual for information concerning the configuration of Access Control.

The OmniLink control employs combinations of two different means to limit access to restricted items. These means are the RUN/PROG key switch on the operator terminal and a user password system. The user password system assigns names and passwords to up to sixteen users. These two means can be used alone or in combination with each other. When a user employs the proper means to gain access, he will have the ability to perform the actions and change the parameters, which have been designated to his control.

There are four possible modes of operation for the restricted access system. They are the "Key Only" mode, the "Key or Password" mode, the "Password Only" mode, and the "Key and Password" mode. The control can be configured to operate in any one of these four modes.

Section 2.2.1 Key Only Mode

The "Key Only" mode is the least complex of the four modes. This mode employs the RUN/PROG key as the only means to limit access to restricted items. Any user with the RUN/PROG key can access all of the restricted items. Without the RUN/PROG key, user access to all of the restricted items is prohibited.

Although the "Key Only" mode has the advantage of being easy to use, it does have a disadvantage. This mode cannot give a particular user access to only some of the restricted items. When operating in this mode, any user with the RUN/PROG key will have access to all of the restricted items.

Section 2.2.2 Key or Password Mode

The key or password mode allows for either of two means to gain access to the restricted items. A user with RUN/PROG key can access all of the restricted items. A user with the correct password can access the restricted items that have been designated for that particular user only. The system allows for passwords to be assigned to sixteen users. Each user can be assigned access to any or all of the restricted items.

The following is an example of a "Key or Password" mode operation. The RUN/PROG key is given to the die set-up personnel. A press operator is assigned a user name and password. With

the password the operator can reset auto setup faults. This is the only auto setup related item to which the operator has access. In order to load a die, the set-up personnel uses the RUN/PROG key to recall a job from job memory. The set-up personnel will also be able to make changes to auto setup parameters. Once the set-up personnel sets the die and verifies its correct operation, the operator is left to run the die. If an auto setup fault occurs, the operator can enter the correct password and then reset the fault. However, the operator cannot change any auto setup parameter. This will allow the operator to keep running the job and reset faults that occur. If an auto setup parameter needs changing, the set-up personnel must be called to change the parameter.

The example above can be taken one additional step if two press operators are given different user names and different passwords. One operator can be assigned the ability to change auto setup parameters in addition to the ability to reset faults, while the other operator is not assigned the ability to change parameters.

Section 2.2.3 Password Only Mode

The “Password Only” mode allows for sixteen users. Each user can be assigned access to some or all of the restricted items. This mode does not use the RUN/PROG key.

The example listed above indicated that setup personnel required access to all restricted items. In the “Key or Password” mode, the setup personnel used the RUN/PROG key to gain access to all of the restricted items. In the “Password Only” mode, the setup personnel can still have access to all of the restricted items, but the system must be configured as such. The setup personnel must be assigned a user name and password. In addition, all restricted items would be assigned access to the setup personnel.

Section 2.2.4 Key and Password Mode

The “Key and Password” mode requires the user to have the RUN/PROG key, user name, and user password. Operation is basically the same as the Password only mode, except that in addition to entering the password the user must switch the RUN/PROG key to the PROG position.

Section 2.2.5 Restricted Items

The following table lists the auto setup module restricted items name and function.

AUTO SETUP MODULE RESTRICTED ITEMS

NAME	FUNCTION
Auto Setup Reset	Reset Auto Setup Faults
Auto Setup Settings	Change Auto Setup Settings (Pressures, Slide Setpoints, etc.)

Section 2.2.6 Access Control Operation

To gain access control the user must use one of two means or a combination of these two means. These means are the RUN/PROG key or the user password system.

Section 2.2.6.1 RUN/PROG Key Switch Operation

The RUN/PROG key switch is located on the lower right side of the operator terminal. This is a two-position switch. The key is removable in the RUN position only. If the RUN/PROG key switch is being used as a means to access the restricted items, the switch must be turned to the PROG position. When the RUN/PROG key switch is switched to the PROG position, the press will Top Stop and stroking will be prohibited until the switch is returned to the RUN position.

When operating in the Key Only mode the key switch is the only means available to access the restricted items. All restricted items are accessible when the RUN/PROG key switch is switched to the PROG position.

When operating in the "Key or Password" mode, the key switch is one of the means available to access the restricted items. All restricted items are accessible when the RUN/PROG key switch is switched to the PROG position.

When operating in the "Key and Password" mode, the key switch and password must be used to access the restricted items. In this mode, the user will be granted access only to the restricted items that have been assigned to him.

Section 2.2.6.2 Password System Operation

Figure 2.2 displays a typical password entry sequence. This example shows the steps necessary to change a slide adjust setpoint. This is typical for password entry for all restricted items.

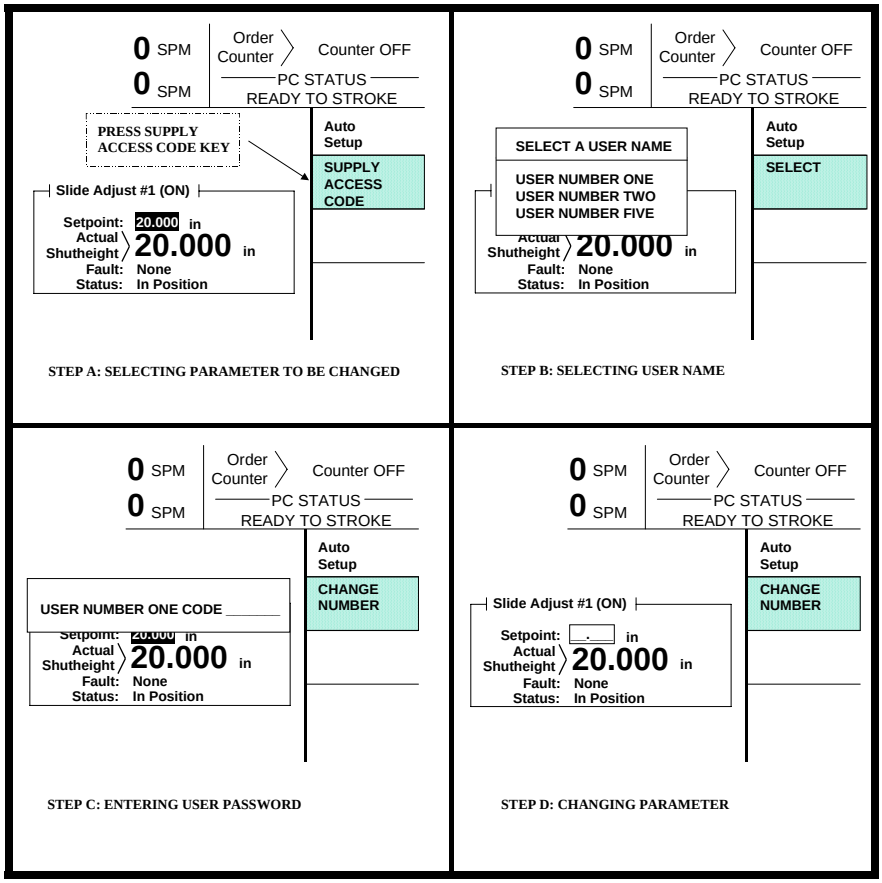

Figure 2-2 Example Password Entry

Step A: Select the restricted item. In the example shown in Figure 2.2 the restricted item is Slide Adjust #1 setpoint. Once the parameter is selected then Softkey # 1, the upper vertical softkey (Softkey # 1 is highlighted in Figure 2.2), will display the legend "SELECT".

Step B: A list of users that have access to this restricted item will appear. In the example shown in Figure 2.2 only User Number One, User Number Two, and User Number Five have access to this restricted parameter. The system may have several more users, but the three users listed on the screen are the only users that have access to change an Auto Setup Setting. The user must use the arrow keys to position the cursor on his user name. After placing the cursor on the correct name, the user must press the SELECT softkey. The SELECT softkey must be pressed even if there is only one user name displayed.

Step C: The display will show the selected user name and request the user password. The user must enter the correct password and then press the ENT key.

Step D: Upon entry of the correct password, the user will be allowed access to the restricted item. In the example shown in Figure 2.2, the user will have access to change the Slide Adjust #1 setpoint.

After performing the steps listed above, the user will be logged in to the password system. The user will have access to all restricted items that have been designated for his access. This access will remain until the user performs a log out or until the user is automatically logged out.

The user can log out by using the ACC key. This key will directly switch the display to the Quick Access screen. The "LOGOUT" soft key legend will appear along the bottom of the screen. If the operator presses this key, he will log out. He will no longer have access to the restricted items, unless he repeats steps A through D.

In addition to the manual log out, the system contains an automatic logout. The intent of automatic log out is to reduce the possibility of users other than the intended user having access to restricted items. If there were no provisions for automatic log out and a user forgot to manually log out, all restricted items to which the user had been designated for access would be available from the log in time until power was removed from the OmniLink control. This presents the possibility of users other than the intended user having access to restricted items. Automatic log out is based upon both time and press strokes. During system configuration automatic Access Timeout parameters are entered. An automatic access timeout time and automatic access timeout strokes are entered. The time entered is the amount of time after the last key stroke that will be allowed before the system will automatically log out the user. For example, if the automatic access timeout is set to 60 seconds, the user will be logged out 60 seconds after the last key stroke. If the user presses a key before the 60 seconds have elapsed, a new 60 second cycle will be started. The number of strokes that are entered is the number of press strokes after the last key stroke that will be allowed before the system automatically logs out the user. For example, if the automatic timeout is set to 10 strokes, the user will be logged out when the press completes ten strokes after the last key stroke. If the user presses a key before 10 strokes have been completed, a new 10 stroke cycle will be started.

Section 3 Installation

Section 3.1 Auto-Setup Module Installation

The OmniLink II Press Automation Control Automatic Setup module can be used with the OmniLink II Press Automation Control system or with the OmniLink 5000 Press Control system. This is illustrated in Figure 3.1. The Automatic Setup module connects to either system via the high speed serial bus.

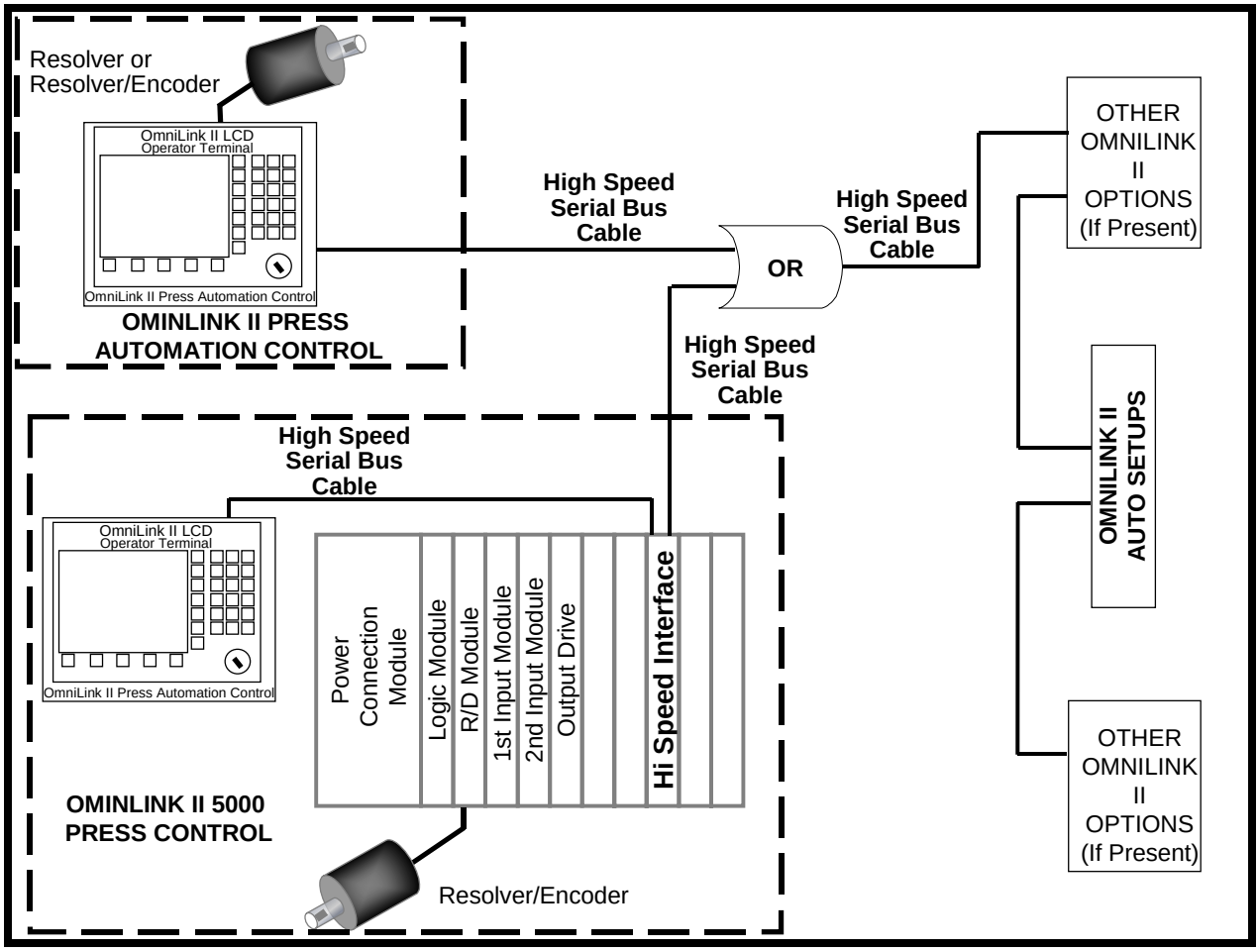

Figure 3-1 OmniLink II Press Automation Controls Connections

The faceplate of the Automatic Setup module is partitioned with labels such as SS1, AS1, etc. These labels represent the type of board that can be installed on the card at that location. SS1 and SS2 can have slide adjust boards installed. AS1 through AS4 can have air adjust boards installed. Note that SS2 overlaps with AS1 and AS2 to allow a second slide adjust card to be installed on a double action press at the expense of the two air slots, AS1 and AS2. The faceplate is shown in Figure 3.2.

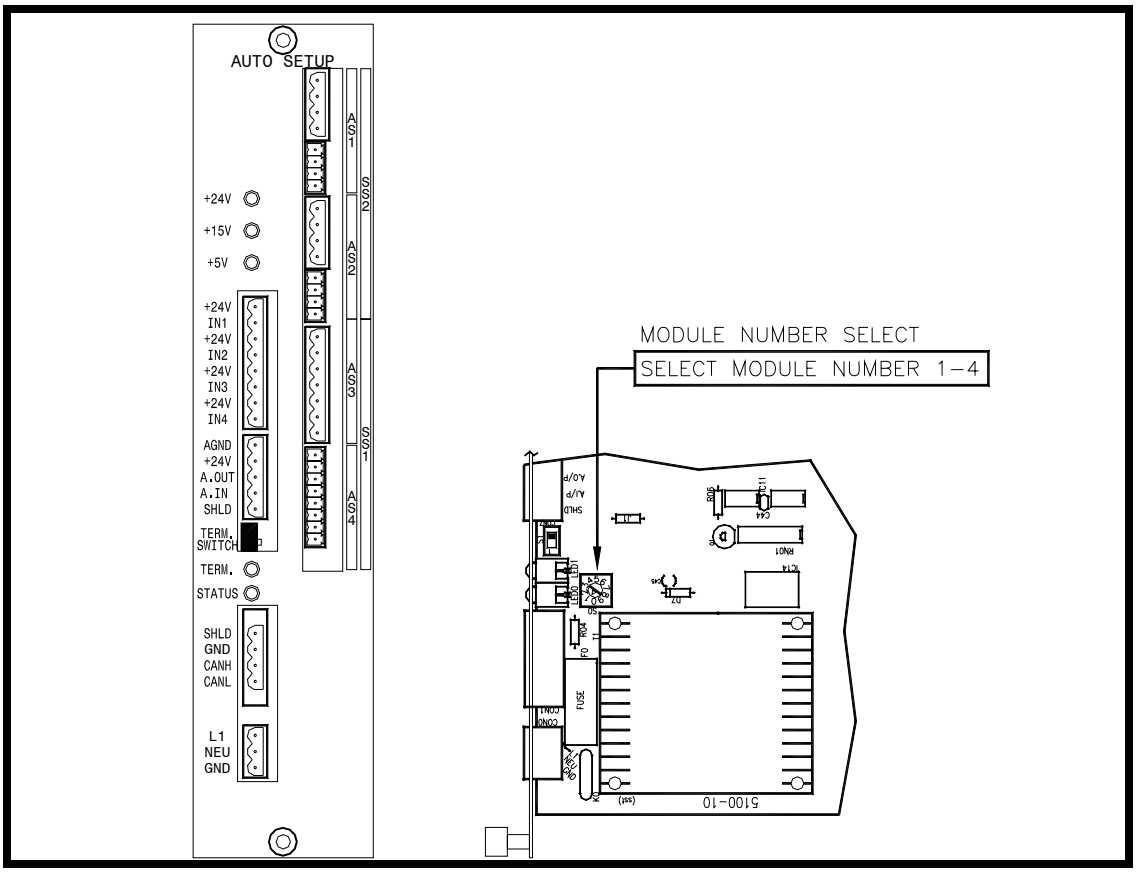

Figure 3-2 Faceplate

Section 3.1.1 Module Assembly

The OmniLink II Press Automation Control Automatic Setup module consists of a base board and optional plug-on boards. Each plug-on board can either add one slide adjust or two air adjust systems. For example if a system of one slide adjust and one counterbalance adjust is required, the slide adjust plug-on board should be installed in the SS1 slot. The air adjust plug-on board should be installed in the AS1 and AS2 slots. In this example only one air adjust system, counterbalance adjust, is required. The AS2 air system will be present, but not used. Each plug-on board is held on to the base card by four #6-32 screws. If not already assembled, install each board on the base card putting slide adjust cards in SS1 or SS2 and air adjust cards in AS1 and AS2 slot or AS3 and AS4 slot.

Section 3.1.2 Assigning Module Number

Up to four 5100-10 OmniLink II Automation Control Automatic Setup modules can be connected. Each module must have its own unique Module Number. This selection is made by use of the rotary switch that is located on the component side of the 5100-10 base circuit board. See Figure 3.2. The numbers should be assigned sequentially starting at one. The system will recognize number one through four. Two units cannot share the same Module Number.

After installing the plug-on boards to the base card and selecting the correct Module Number, slide the base card into the single slot card rack. The board slides into the two guides of the rack. It is held in place with two knurled screws at the top and bottom of the board.

Section 3.1.3 Module Mounting

The OmniLink II Press Automation Control Automatic Setup module can be mounted in the press control enclosure or it can be mounted in its own enclosure. If the unit is subject to shock and vibration, shock mounts are required. Either the card rack assembly can be shock mounted or the enclosure in which it is installed can be shock mounted.

In selecting the mounting location for the OmniLink II Press Automation Control Automatic Setup module, the wiring connections for the unit should be considered. See Section 3.1.3 for the necessary wiring connections. After the mounting location has been determined, the card rack assembly can be secured with four screws. The mounting footprint is show in Figure 3.3.

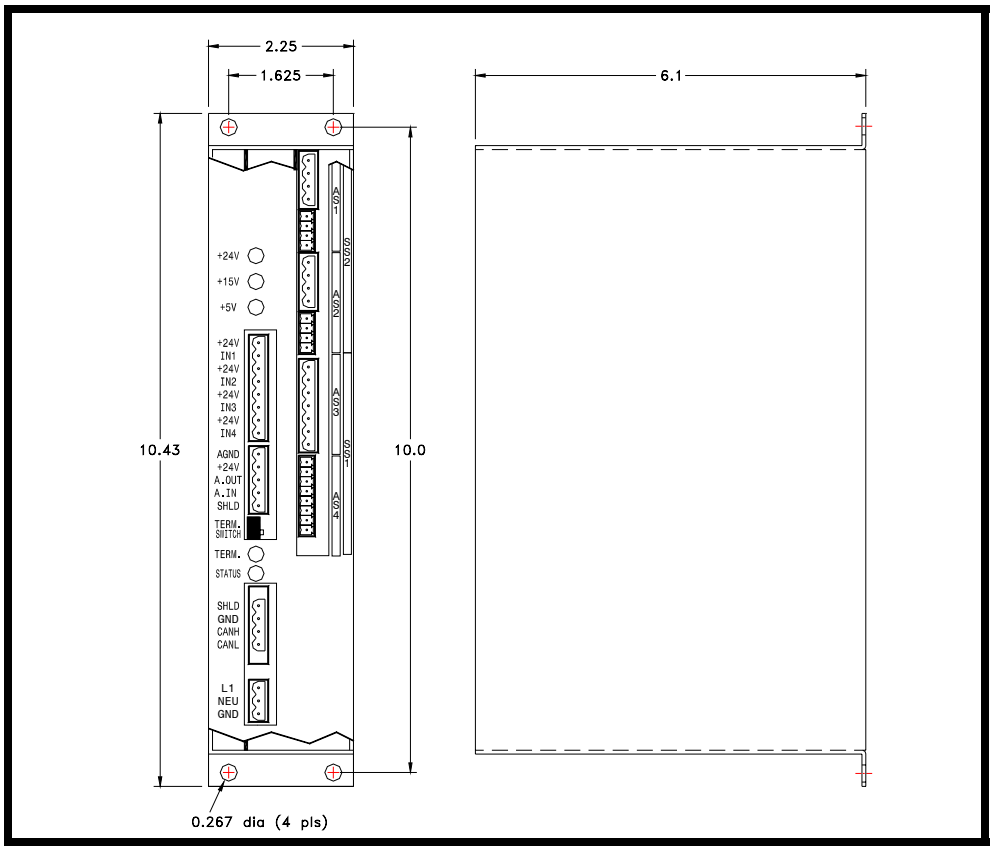

Figure 3-3 Module Mounting Dimensions

Section 3.1.4 Module Wiring

The primary wiring diagram for Automatic Setup module is shown in Figure 3.4. The following connections and operations must be done:

1. Input Power
2. High Speed Serial Bus Cable
3. Set High Speed Serial Bus Termination Switch

Wiring of the slide adjust systems and air adjust systems will be described in the specific sections which describe their use and their connections.

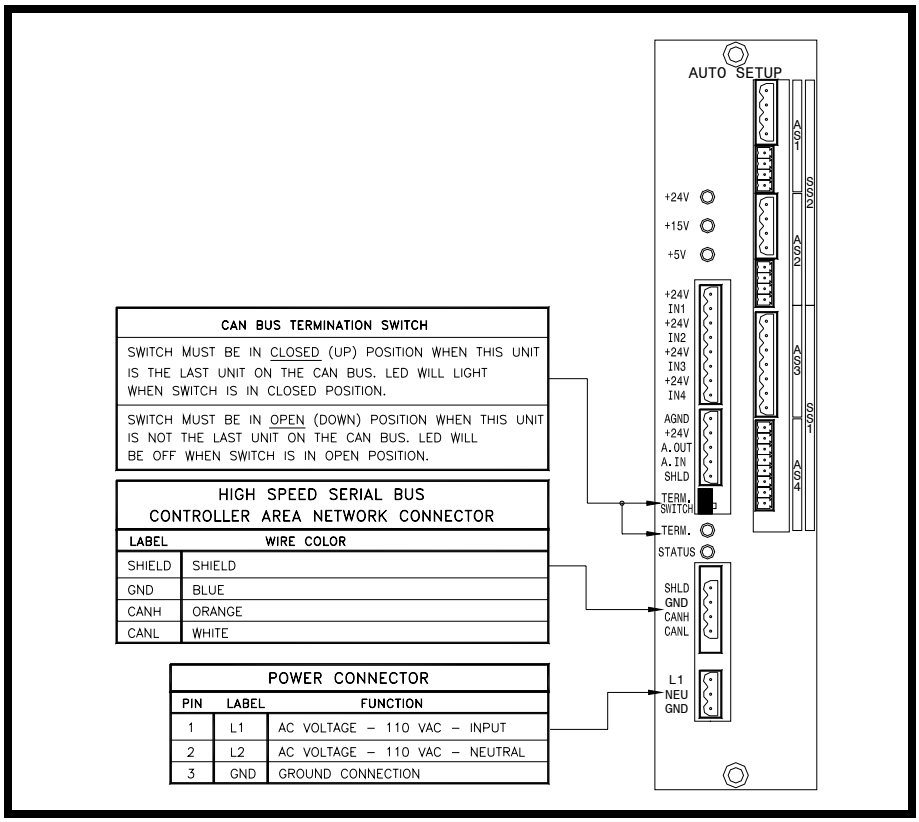

Figure 3-4 Primary Wiring and High Speed Bus Termination

Section 3.1.4.1 Wiring Input Power

Connection of AC input power is made to the 3 pin terminal block on the bottom of the module. The pinout is provided on Figure 3.4. The 3 pin plug supplied for connection of input power is a dual connector plug. This dual connector plug allows for input power to be strung from module to module if additional OmniLink II Press Automation Control modules are to be wired from the same power source.

Section 3.1.4.2 Wiring High Speed Serial Bus Cable

The high speed serial bus cable is wired to the 4 pin terminal block that is just above the power connector terminal block. The pinout is provided on Figure 3.4. The cable that is supplied by Link Systems for the high-speed serial bus that interconnects the various components of the OmniLink II Press Automation Control must be used. This cable must run from device to device without being spliced.

The 4 pin plug supplied for connection of the high speed serial bus is a dual connector plug. This dual connector plug allows for the high speed serial bus cable to be strung from module to module if an addition OmniLink II Press Automation module is to be connected from this unit.

Section 3.1.4.3 Setting High Speed Serial Bus Termination Switch

The high speed serial bus termination switch must be placed in the correct position. The high speed serial bus termination switch is labeled “Term. Switch”. If this device is the last device in the serial bus string, the termination switch must be placed in the closed (up) position. The red LED indicator next to the switch will light when the switch is in the closed position. The last device in the serial bus string will have only one high speed serial bus connection to the 4 pin dual plug. The last device will have a connection from the previous device, but will not connect to any other devices. If this device is not the last device in the serial bus string, the termination switch must be placed in the open (down) position. The red LED will be off when the switch is in the open position.

Section 3.2 Valve Systems

Counterbalance and cushion systems are very similar in the way they are controlled. Three basic integrated valve configurations are available from Link to be used with the OmniLink II Press Automation Control Automatic Setup module. For clarity in the following sections, these valve configurations are defined here.

Type “A” An integrated Fill/Dump Valve as shown in Figure 3.5. This valve has the advantage of simple straight through piping with all pilot pressures run internally and is easily mounted. It may be used for air cushion and air counterbalance control. This is the least expensive of the three valves. Leaks in cushion and counterbalance systems will cause loss of pressure in these systems when either control power is off or supply pressure is absent. However, the control must be turned back on and pressure re-established before the press will stroke.

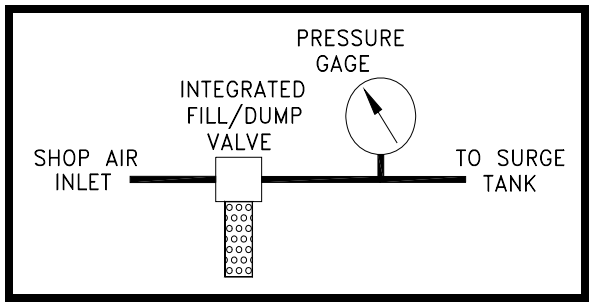

Figure 3-5 Type "A" Valve Configuration

Type “B” An integrated Fill/Dump valve with a manual regulator, check valve, and LOX valve in parallel as shown in Figure 3.6 for cushion, but not counterbalance, adjustment. This valve adds a parallel manual regulator system to the Type “A” valve, which may be set to prevent the air pressure in the cushion from going

below a **minimum** value set by the manual regulator (as long as there is shop air pressure). This prevents cushion drift down when control power is off with its associated lost die pins below the press bolster and lost time while they are recovered. This valve also allows the cushions to be adjusted using the manual regulator path if the automatic system fails, allowing the press to be operated until the automatic system is restored. When the automatic system is on, the manual regulator on this valve system **must not** be set higher than the lowest pressure that the automatic system is to provide, because the automatic valves will try to dump while the manual regulator fills if the automatic setpoint is lower than the manual regulator pressure.

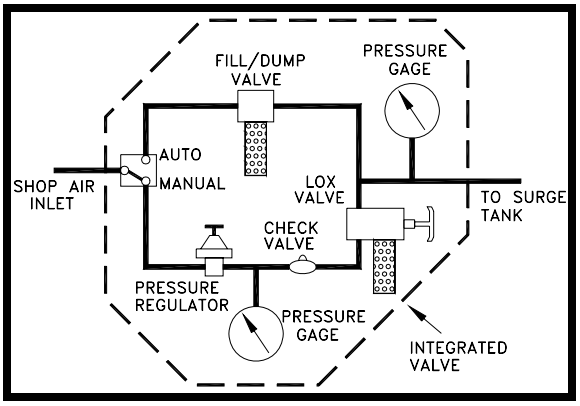

Figure 3-6 Type "B" Valve Configuration

Type "C" An integrated Fill/Dump valve with a manual regulator, check valve, and LOX valve, and a four-way valve that selects whether the pressure is set by the automatic system or the manual regulator as shown in Figure 3.7 for cushion and counterbalance adjustment. Unlike the type "B" valve, the manual regulator can be set to any allowable pressure without interfering with automatic pressure adjustment. It does not have to be a minimum pressure. This system is ideal for press counterbalance systems as the manual regulator can be set to balance the heaviest die used on the press. When the OmniLink II Press Automation Control Automatic Setup module is powered off, the valve automatically reverts to at least the pressure set by the manual regulator. If there is an air leak in the counterbalance system, the manual regulator keeps the system charged to support the weight of the die.

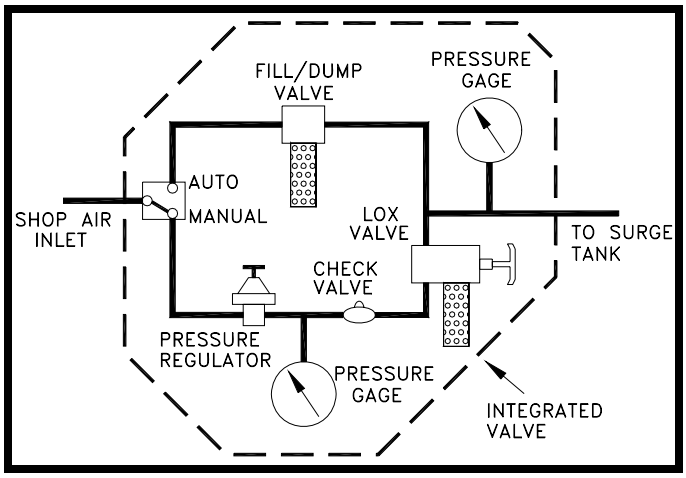

Figure 3-7 Type "C" Valve Configuration

Section 3.3 Counterbalance Control Installation

The automatic counterbalance control system consists of an air control board mounted on the 5100 Automatic Setup base board, a control valve (or valves), and a pressure transducer. The typical manually controlled press counterbalance system looks something like Figure 3.8.

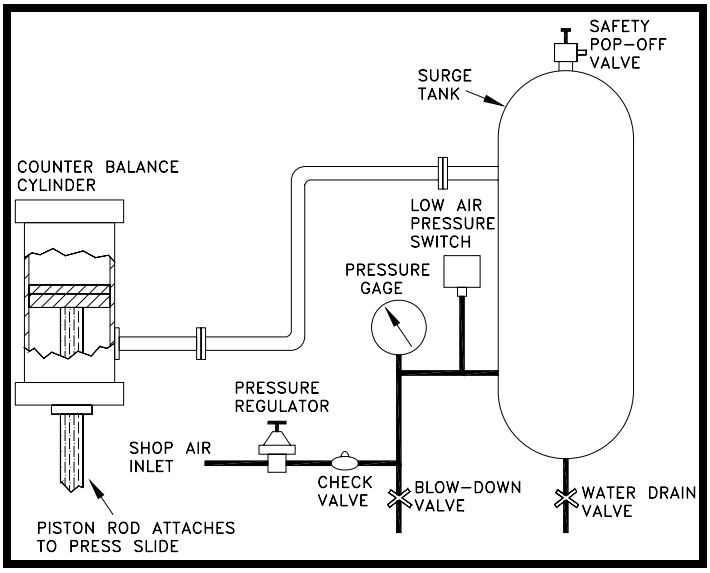

Figure 3-8 Typical Counterbalance System

For automatic control, the pressure regulator and check valve are replaced with an air valve system. Figures 3.9 and 3.10 illustrate systems using the Type “A” and Type “C” valves described in Section 3.2. In all cases a pressure transducer is used to monitor the air pressure.

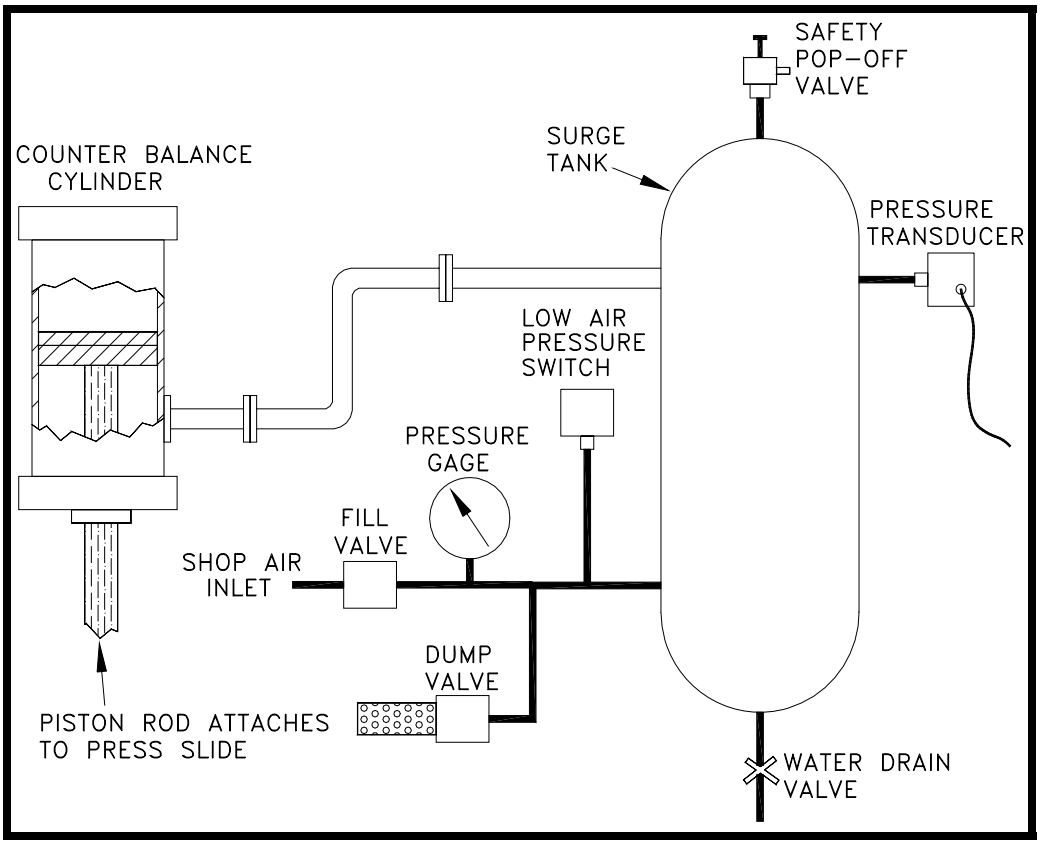

Figure 3-9 Auto-Counterbalance with Type “A” Integrated Valve

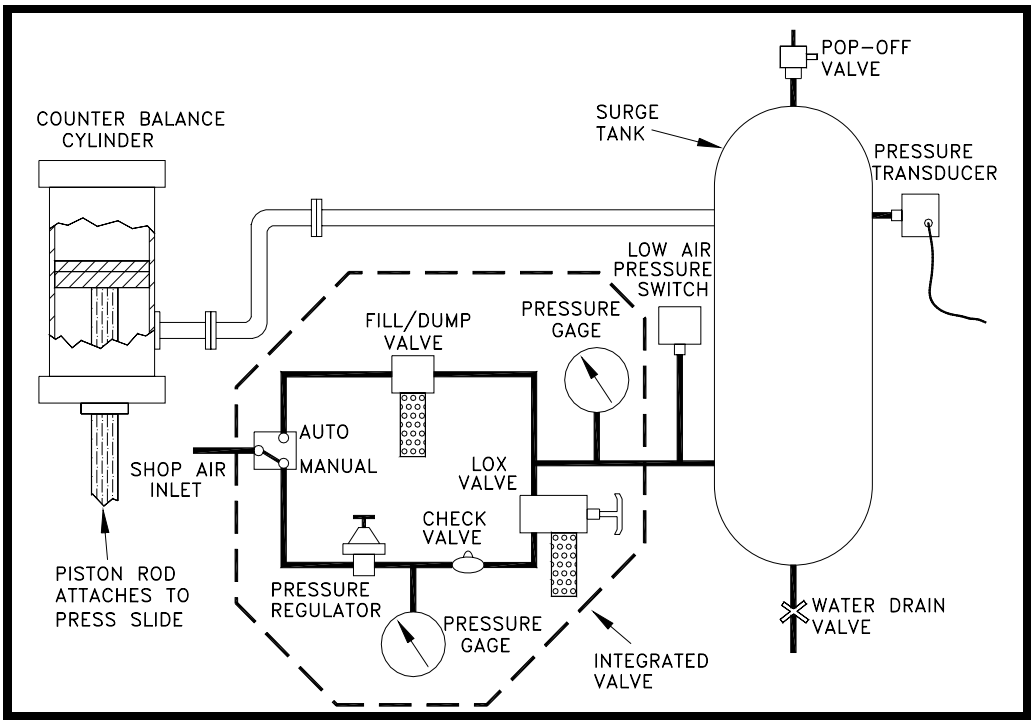

Figure 3-10 Auto-Counterbalance with Type "C" Integrated Valve

Section 3.3.1 Counterbalance Pressure Transducer Mounting

The system uses an automatic method of control in which the fill valve or dump valve is energized to raise or lower the pressure of the system and a pressure transducer is used to "tell" the Automatic Setup board the system pressure. The pressure transducer is constantly monitored to verify that the system is at the proper pressure. When filling or dumping air into or out of the counterbalance, the transducer tells the system when to stop. Because air pressure drops occur across air lines when filling or dumping, proper placement of the pressure transducer is very important for correct operation of the system. Possible pressure transducer mounting locations from best to worst are (refer to Figure 3.11):

a) A spare port on the counterbalance surge tank.

b) The same port that the safety pop-off valve is mounted on if it has its own port on the surge tank.

c) Right at the outlet on the surge tank that goes to the counterbalance cylinder.

d) Right at the inlet on the surge tank from the Fill/Dump valves.

e) If there is no surge tank the pressure transducer should be mounted right at the inlet on the counterbalance cylinder.

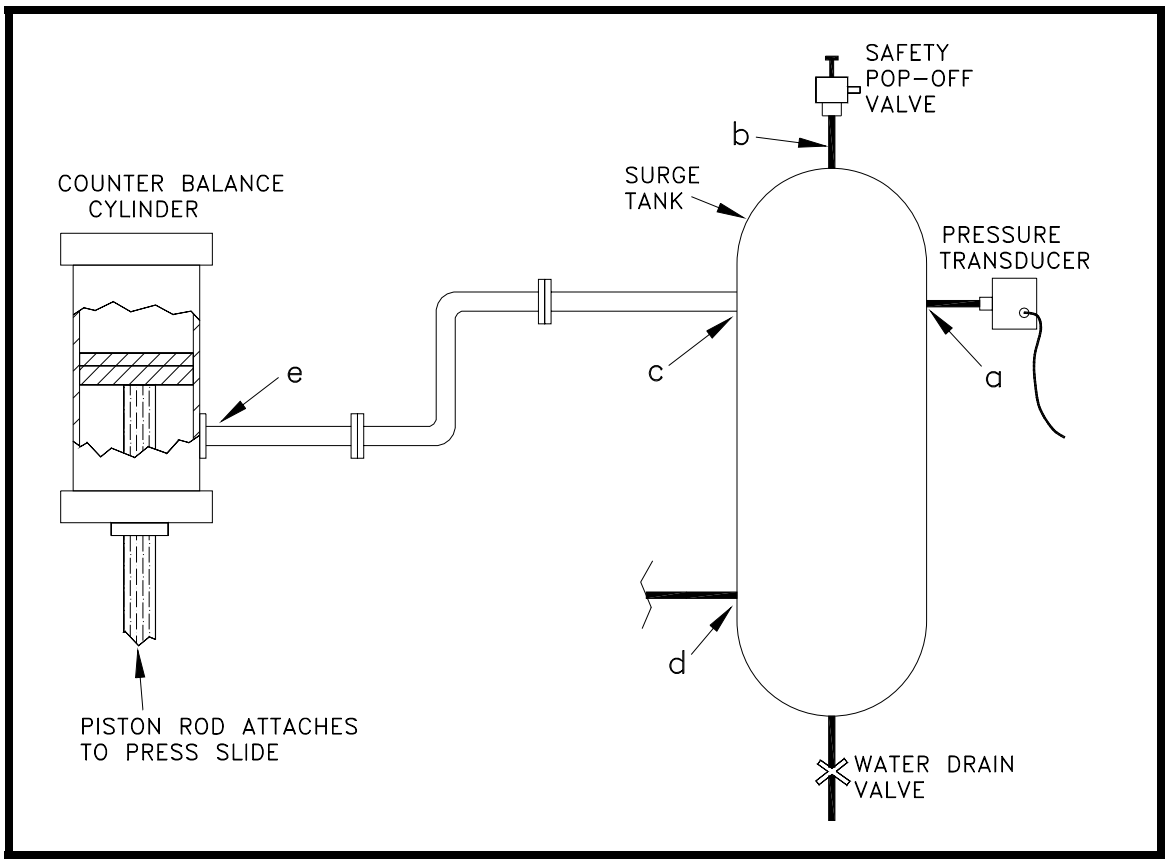

Figure 3-11 Acceptable Locations for Mounting counterbalance Pressure Transducer

Section 3.3.2 Counterbalance Air Valve System Mounting

The mounting location of the valve system is not critical. Consideration should be given, however, to ease of maintenance, plumbing, and wiring when choosing the mounting location. Also note that sometimes the check valve in the original system may be up at the surge tank itself. The check valve in the original system *must* be removed for the automatic system to work properly.

Section 3.3.3 Counterbalance System Wiring

Refer to Appendix B, Figure B.1, for typical wiring of the counterbalance valve and pressure transducer. Note that the auto-select connection is used only for a type "C" valve. For type "A" valves, the auto-select connection from pin 2 of the counterbalance board is not required.

Section 3.4 Cushion System Installation

The typical manually adjustable press cushion system looks something like Figure 3.12.

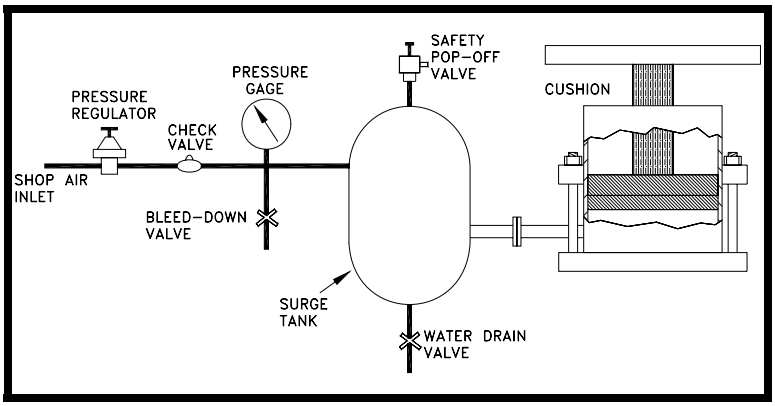

Figure 3-12 Typical Standard Cushion System

For automatic control, the pressure regulator and check valve are replaced with an air valve system. Figure 3.13 shows a system using a Type "B" valve as described in section 3.2. Type "A" and "C" valves may also be used. A pressure transducer is used to monitor the air pressure.

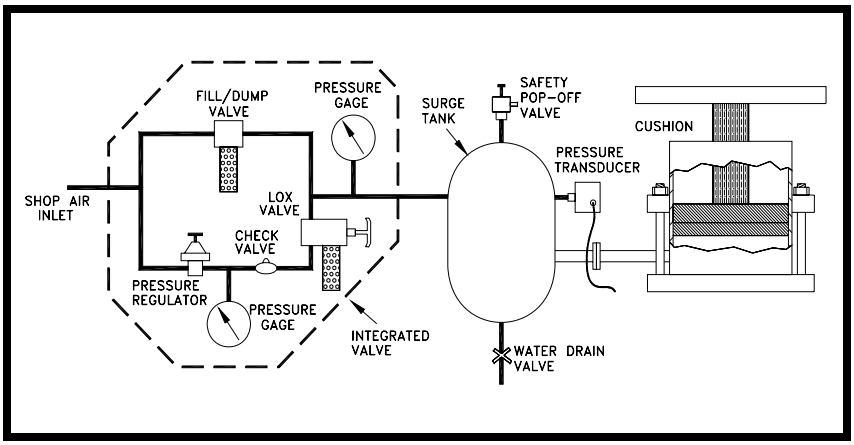

Figure 3-13 Cushion System with Type "B" Integrated Valve

Section 3.4.1 Cushion Pressure Transducer Mounting

The system uses a method of control in which the fill valve or dump valve is energized to raise or lower the pressure of the system. The pressure transducer tells the system when it has reached the proper pressure. Because air pressure drops occur across air lines when filling or dumping, proper placement of the pressure transducer is very important for correct operation of the system. Possible pressure transducer mounting locations from best to worst are (refer to Figure 3.14):

a) A spare port on the cushion surge tank.

b) The same port that the safety pop-off valve is mounted on if it has its own port on the surge tank.

c) Right at the outlet on the surge tank that goes to the cushion.

d) Right at the inlet on the surge tank from the Fill/Dump valves.

e) If there is no surge tank the pressure transducer should be mounted right at the inlet on the cushion.

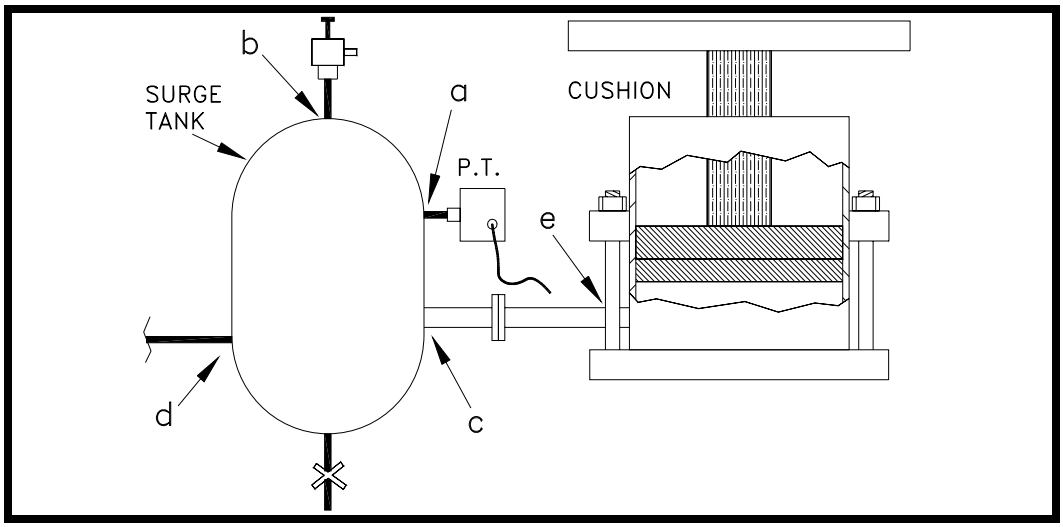

Figure 3-14 Acceptable Location for Mounting Cushion Pressure Transducer

Section 3.4.2 Cushion Air Valve System Mounting

The mounting location of the cushion air valve system is not critical. Consideration should be given, however, to ease of maintenance, plumbing, and wiring when choosing the mounting location. Also note that sometimes the check valve in the original system may be up at the surge tank itself. The check valve *must* be removed for the automatic system to work.

Section 3.4.3 Cushion System Wiring

Refer to Appendix B, Figure B.2, for typical wiring of the cushion valve and pressure transducer. Note that the auto-select connection is only connected if a type "C" integrated valve is used. For type "A" and "B" valves, the auto-select connection from pin 2 of the cushion board is not required.

IN3 is the cushion dump input. If IN 3 goes high, 24 V, the cushion dump solenoid will turn on to release cushion pressure. If a Type "B" valve is being used for cushion pressure control, the cushion pressure will go to the **minimum** value set by the manual regulator (as long as there is shop air pressure). A separate dry contact is required to connect IN 3 to 24 V for each automatic setups module being used for cushions control. If more that one automatic setup module is being used to control multiple cushions, IN 3 on each module must be connect to the 24 V connection on the same module. Do not connect 24 V from one module to the IN 3 of another module.

Section 3.5 Slide Adjust System Installation

Standard slide adjust systems that set shut height on presses vary widely depending on manufacturer and age. In general, slide adjust systems are either manually turned by wrenches or levers, or use electric or air motors to adjust the shut height. The OmniLink II Press Automation Control automatic slide adjust system can only be used on presses with motorized

slide adjust. Slide adjust motor(s) must be wired to the automatic shut height adjust board(s). In addition, a transducer must be mounted in such a way as to detect slide adjust position and wired to the automatic shut height board. Rotary transducers may be used when shafts that turn when shut height is adjusted are accessible such as a shaft that drives a mechanical shut height indicator.

Section 3.5.1 Rotary Transducer Mounting

The Automation Control module software supports the use of a rotary transducer for the slide adjust position feedback. These transducers are based on dual resolvers to provide an absolute position indication. Resolvers are tough and accurate rotary position sensors. By using two resolvers mounted in an enclosure with one resolver geared down relative to the other, a multi-turn resolver (typically around 100 turns or 180 turns) is created.

As mentioned earlier, just about every slide adjust system is different. Some point must be found that rotates when the slide is adjusted. Some obvious points are the slide adjust motor shaft and the shaft that drives a dial counter (if present) that indicates slide position. Depending on the press, there may be other points that can be used. The resolver should be tied in to one of these points and may need to be geared up or down. Requirements are:

a) The resolver should be mounted where it will not be submerged in oil, grease, or other contaminants.

b) The slide should travel **no more** than 1 inch per turn of the resolver.

c) The cable from the resolver to the OmniLink II Press Automation Control Auto Setups module should not be run with any high voltage wiring (i.e. 120/240 VAC). In fact, this cable should be run in its own shielded conduit.

It is not necessary to know the exact gear ratio of slide travel to resolver turns - only that condition “b” is met. The resolver may rotate in either direction relative to slide travel (i.e. the resolver may rotate clockwise or counter-clockwise as the slide goes down).

Section 3.5.2 Rotary Slide Adjust Wiring

A cable must go from the dual resolver mounted on the slide to the Automatic Setup module. Since the slide goes up and down relative to the machine, some means of stress relief must be used on the cable between the slide and the machine frame. The recommended method is to use a helical cable (same principle as a telephone handset cord) from the resolver to a junction box on the bottom of the crown. This lets the wire run in a “spring” pattern to help it resist breaking.

Appendix B, Figure B.3 shows a conceptual view of this type of resolver mounting. The junction box should be grounded to the machine to help shield the connections inside.

NOTE:	The cable should remain unbroken except for the connector in this junction box to the shield integrity – do not splice the cable.

Slide adjust motor starters with and without auxiliary contactors are supported. Solenoid air valves for air motors are also supported. Refer to Appendix B for typical wiring diagrams. Figures B.4 shows the wiring for an AMCI dual resolver. Figures B.5 and B.6 show the wiring of slide adjust motor starters with and without auxiliary contactors. Figure B.7 shows the wiring of a slide adjust air motor.

If remote Jog Up and Jog Down push buttons are used, they should be wired as shown in Figure B.8. Since the OmniLink II Press Automation Control Automatic Setup module can support up to two slide adjust systems, inputs are available for Jog Up and Jog Down push buttons for both slide adjust systems. Normally, only one slide adjust system is required per press.

Section 4 Configuration

After the OmniLink II Press Automation Control Automatic Setup module is installed (see section 3.1), it must be configured to work with the press. Configuration consists of several steps that depend on the options selected for the module. This System Configuration is normally performed at start-up. It is usually not necessary to change the System Configuration unless devices are added or removed from the system.

Care must be used during maintenance and troubleshooting to insure that necessary devices are not removed from or added to the System Configuration. Maintenance should not REMOVE or ADD devices unless the consequences of these actions are fully understood. Removal of necessary devices will mean that these devices will no longer be able to perform their intended function. Addition of devices that are not actually present will result in error conditions that will prevent press operation until the error conditions are removed.

NOTE!	An access code is required to reach the configuration menus of the OmniLink 5000 Press Control and OmniLink II Press Automation Control. The code is provided separately from this manual for administrative control.

⚠ CAUTION. Certain configuration settings affect safety considerations, such as Brake Monitor limits, and others could affect whether elements of your production process are properly controlled or monitored by the OmniLink 5000 Press Control or OmniLink II Press Automation Control. User configuration should be limited to persons who have read this manual and other pertinent manuals completely and who are authorized by the employer to configure the system. Incorrect Brake Monitor limit settings may indirectly expose an operator to danger at the point of operation if stopping time is allowed to increase beyond the value used to calculate safety distance for presence sensing or two hand control safeguarding devices. Incorrect sequencing or monitoring caused by incorrect settings may lead to damaged dies, press, or auxiliary equipment. This machine and tool damage may result in injury or death to persons.

Section 4.1 Configuring the OmniLink II for the Auto-Setup Module

The OmniLink II Press Automation system uses distributed intelligence in a variety of logic modules so that it offers maximum flexibility for specific applications. The OmniLink II Operator Terminal is the central integrating intelligence that communicates over serial communication channels with each hardware module to allow seamless programming of monitoring and control functions and display of information for each module. The Device Configuration Menu is used to “tell” the OmniLink II Operator Terminal the specific hardware modules used with the particular system with which it needs to communicate. Each hardware module used with the system must have power and its high speed serial cable connected during

device installation.

The Device Configuration menu is also used to update the software in the various modules used with the system when needed or desired, although this normally will not need to be done when the system is initially configured. The OmniLink II Operator Terminal provides for the insertion of a smart media card with updated software to download to the various modules used with the system. Instructions for updating firmware will be included with the updated firmware.

The Device Configuration Menu is accessed from the Quick Access screen shown in Figure 4.1. Pressing the ACC key on the operator terminal keypad causes the Quick Access screen to be displayed.

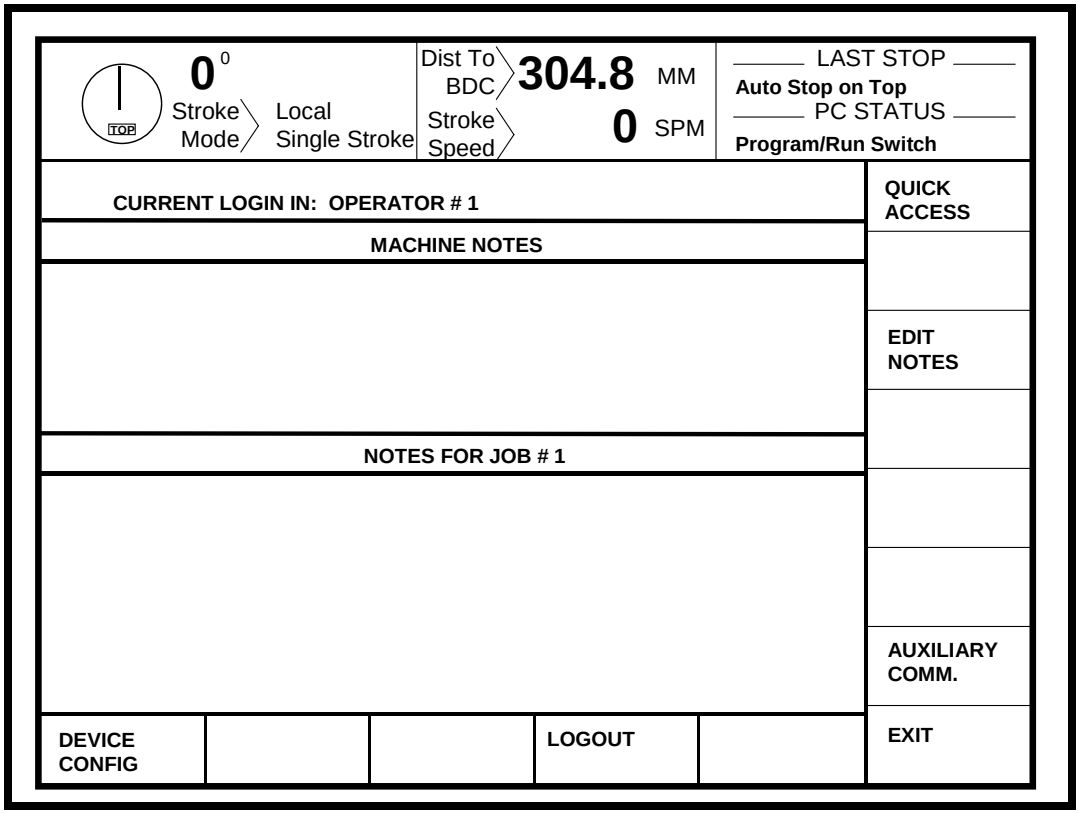

Figure 4-1 Quick Access Screen with Program/Run Switch in Program Position

The DEVICE CONFIG softkey in the lower left corner of the screen appears **only** with the Run/Program switch in the Program position. Pressing the DEVICE CONFIG softkey causes a box to popup which requests that you enter the User Configuration Code, the highest order user password. After entry of the correct code, the first page of the Device Configuration screen, shown in Figure 4.2, is displayed.

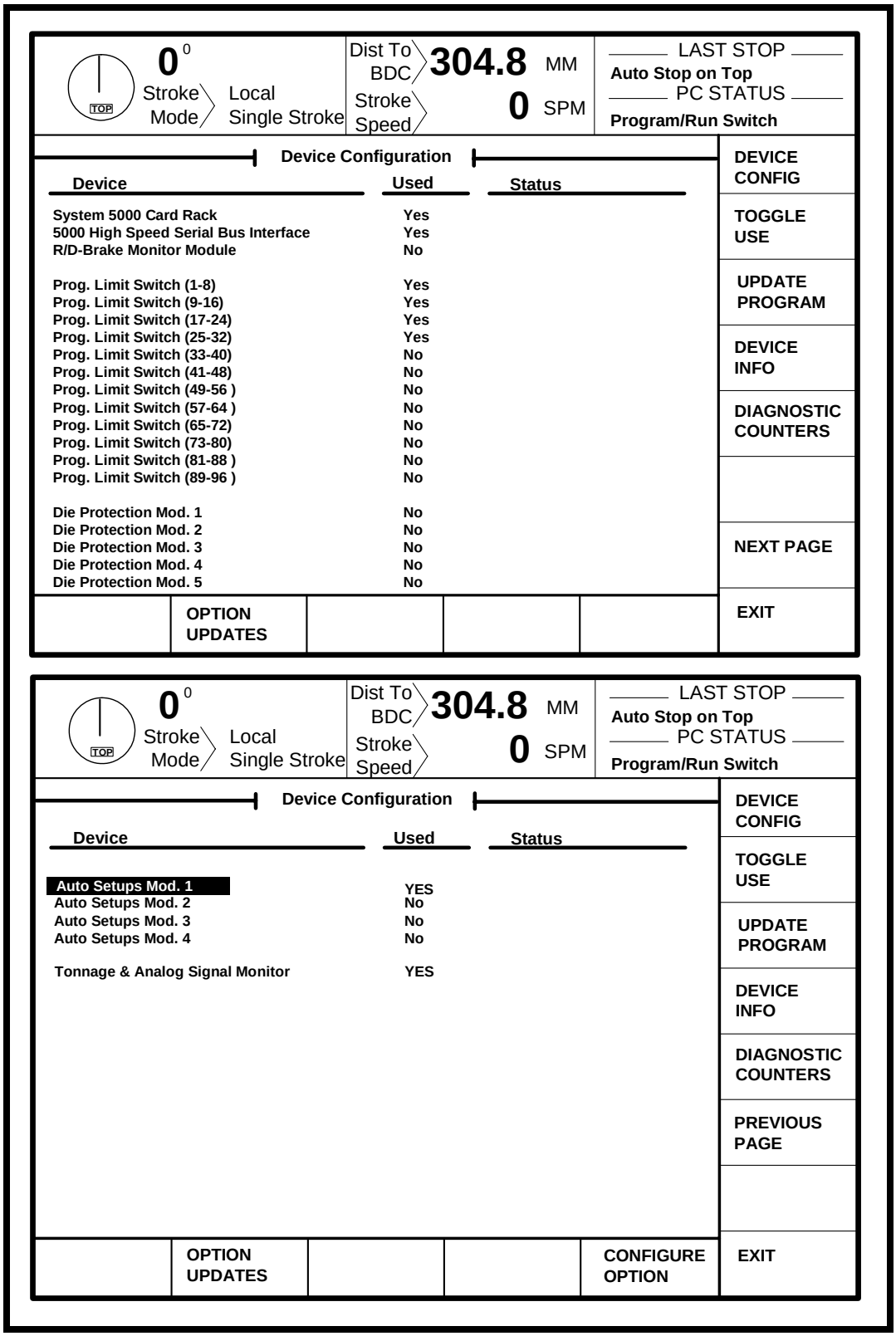

Figure 4-2 Device Configuration Screen

The left column of the Device Configuration screen lists hardware modules that can be used with the system. The center column indicates whether the device is used with this particular

OmniLink system. The right column is used to indicate information pertaining to device status, such as “detected”, which means the Operator Terminal has established communication with the module. The TOGGLE USED softkey will toggle the “Used” column for the highlighted (selected) device from No to Yes or Yes to No. The UPDATE PROGRAM softkey is used only in rare instances where it is desired to update software for a selected device to a newer version.

The Device Configuration screen indicates the following devices that must be configured whether or not are they are used with the system. An explanation of the Device Configuration items is listed below.

1. System 5000 Card Rack and 5000 High Speed Serial Bus Interface. The System 5000 Card Rack is the clutch/brake control with the necessary input modules and output drive module. The 5000 High Speed Serial Bus Interface module is required to communicate with the other OmniLink II Press Automation Control options, such as the Automatic Setup module. Both of these items must be configured for “Yes,” if the System 5000 Press Control is part of the system. If these two items are set to “Yes,” the R/D – Brake Monitor Module should be set to “No.”

2. R/D – Brake Monitor Module. This module is used in OmniLink II Press Automation Control system applications that do not include the OmniLink 5000 Press Control. When the OmniLink II Press Automation system is being used without the OmniLink 5000 Press Control, this must be configured “Yes.” If this item is set to “Yes,” both the System 5000 Card Rack and the 5000 High Speed Serial Bus Interface items should be set to “No.”

3. Programmable Limit Switch Outputs. The system provides for up to 32 programmable limit switch outputs. These outputs are options that come in groups of 8. Each group of 8 channels is pre-numbered and will be recognized by the operator terminal to be the specific pre-numbered group. If a group is to be used, it must be configured “Yes.”

4. Die Protection Modules 1-5. The system provides for up to 5 die protection modules. Any connected module should be configured “Yes.”

5. Auto Setup Mod. 1-4. The system provides for up to 4 automatic setup modules. Any connected module should be configured “Yes.”

6. Tonnage & Analog Sig. Monitor. If an OmniLink II Press Automation Control Tonnage & Analog Signal Monitor module is part of the system, this parameter should be configured to “Yes.”

Section 4.2 Configuring the Automatic Setup module

Now that the system has been configured to recognize the OmniLink II Press Automation Control Automatic Setup module, the module itself must be configured for the each shut height and air adjust option that is installed on it. The configuration necessary depends on the particular kind of option (air adjust or slide adjust) installed. To enter the Automatic Setup configuration screen:

a) Go to the Auto Sets screen. This screen is reached by pressing the AUTO SETS softkey in the Main Menu or Press Control screen.

b) With the RUN/PROG key switch in the PROG position, press the CONFIGURE softkey and enter the configuration code. Note that the code is provided separately from this manual for administrative control.

The screen shown in Figure 4.3 will appear.

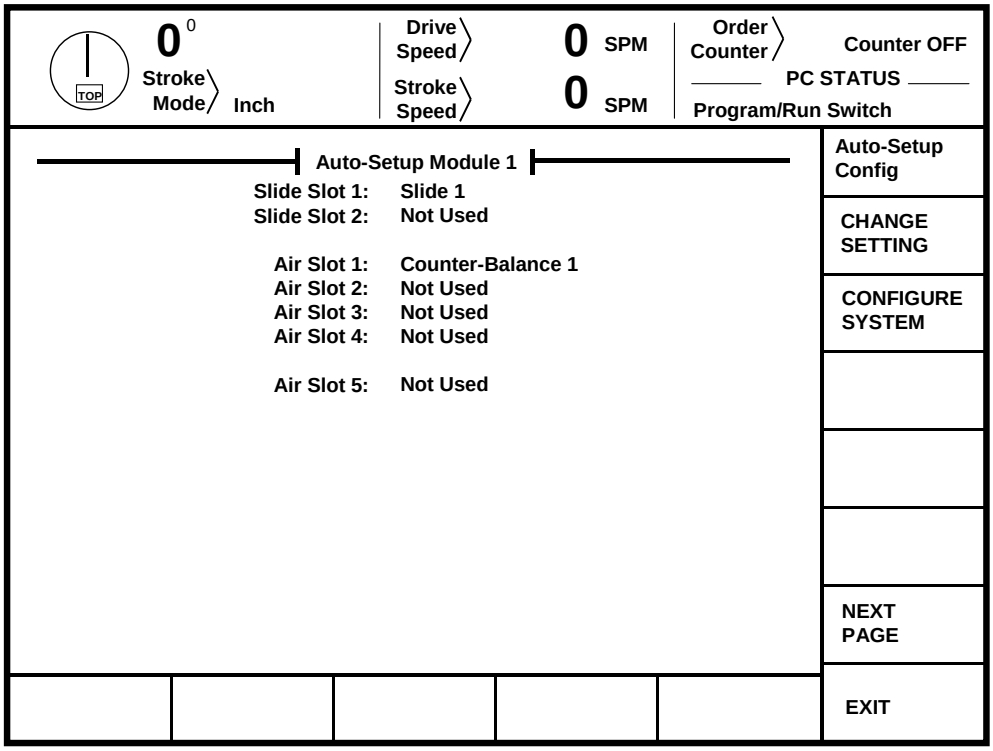

Figure 4-3 Auto-Setups Module Configuration Screen

Auto-Setup Module 1 configuration options are displayed in Figure 4-3. If more than one automatic setup module is present, press the NEXT PAGE softkey to display the next module. All connected modules must be configured.

Section 4.2.1 Configuring Air Systems

The OmniLink II Press Automation Control Automatic Setup module can control counterbalance pressure, cushion pressure, and hydraulic overload control pressure. Counterbalances and cushions are conceptually very similar and use essentially the same control techniques. Hydraulic overloads are somewhat different but are usually systems controlled by air pressure (there are some non-air controlled hydraulic overloads but the auto-setup board does not support them) {Hydraulic Overload trip point control is currently unavailable}.

To start the configuration process for an installed air system, the hardware slot must be told the type of device that it is to control. Slots AS1 to AS4 can control either counterbalances or

cushions. Slot AS5 controls hydraulic overloads. {Hydraulic Overload trip point control is currently unavailable}. In Figure 4.3, slot AS1 has already been assigned for control of a counterbalance. If it is necessary to add, change, or modify an Air Slot assignment, move the cursor to the Air Slot to be modified and press the CHANGE SETTING softkey. A list of available assignments for the Air Slot will appear. Move the cursor to the desired assignment and press the SELECT softkey.

After a control function has been assigned to an air slot, the system must be configured. This configuration sets parameters, such as minimum air pressure, maximum air pressure, and tolerance limits. The number and types of parameters will depend upon the function assigned to the air slot. To configure a particular air system, move the cursor to that system and press the CONFIGURE SYSTEM softkey.

Section 4.2.1.1 Configuring Counterbalance Systems

The counterbalance configuration screen is shown in Figure 4.4.

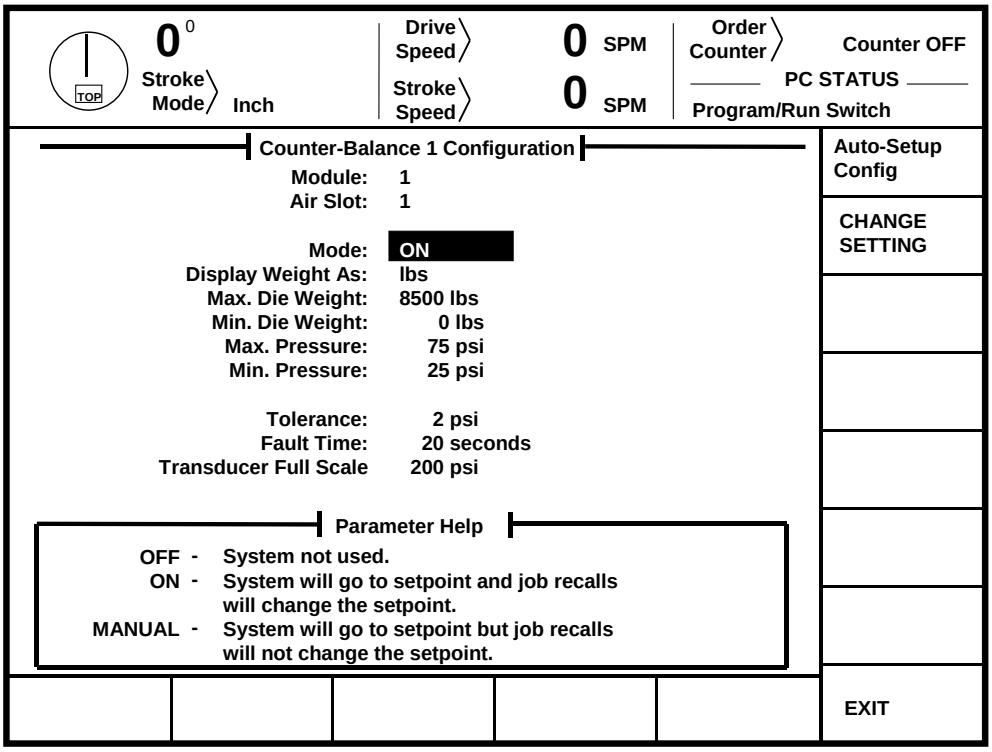

Figure 4-4 Counterbalance Configuration

The editing cursor indicates which parameter is currently selected. Softkey 1 (the uppermost vertical softkey) will change its description based on the parameter and, when pressed, allows the currently selected parameter to be changed. The up and down arrow keys move the editing cursor from one parameter to another. *See Appendix A for examples of setting up each kind of system.* The features of this screen are:

Help The "Help" box at the bottom of the screen changes depending on the

parameter that the editing cursor is currently on. It gives a short version of how the parameter is used.

Module — Corresponds to the number of the Automatic Setups module that is currently being configured. Typical systems will have only one module. Up to four modules can be connected to one OmniLink II Press Automation Control or OmniLink 5000 Press Control.

Air Slot — Corresponds to the physical slot number (AS1 in the example of Figure 4.3) selected for configuration on the auto-setup card.

Mode — Use the CHANGE MODE soft key to cycle the status from *ON* to *MAN* to *OFF* and back to *ON*. *ON* means the module will automatically adjust the air pressure when a job is recalled to the air pressure associated with that job. *MAN* means the module will automatically adjust the air pressure, but the pressure can only be changed from the Auto Setup screen by entering the desired air pressure. A recalled job will NOT change the pressure if you configure the module to *MAN*. *OFF* means the module will not control the air pressure. This value should typically be set to *ON*.

Display Weight As — Set this parameter to the units that die weight should be displayed in. The choices are pounds (lbs), kilograms (Kgs), tons, and metric tons (Mtons). Note that the display unit can be changed at any time. If a job was stored in tons, and this unit is changed to pounds, the stored job will still be correct. For example, if 2 tons were stored for a job and the display unit is changed to pounds, when the job is recalled it will be set to 4000 pounds.

Max. Die Weight — This should be set at the die weight the counterbalance handles at its maximum pressure. Obtain this value from the press counterbalance table or press manual.

Min. Die Weight — Set this value to 0 die weight. (This represents no tooling on the upper slide at the minimum counterbalance pressure).

Max. Pressure — This value should be set to the maximum operating air pressure at which the counterbalance is designed to operate. This is the pressure which counterbalances the heaviest upper die the press is designed to accommodate. The press counterbalance table (typically mounted on the press) or the press manual should give this value.

Min. Pressure — This value should be set to the minimum operating pressure at which you will operate your counterbalance. This value is the pressure that balances the slide with no tooling and cannot be set below 5 psi. Obtain this value from the press counterbalance table or press manual.

Tolerance — This is the amount by which the system will allow the pressure to vary and still be considered “good”. For instance if tolerance is 2, then a setting of 30 psi will be considered “At Pressure” from 28 to 32 psi. Suggested

setting is 2.

Fault Time If the pressure in the counterbalance goes out of tolerance due to a leak or any other reason, a countdown starts. The module will try to bring the pressure back into tolerance before the countdown expires. If it cannot correct the pressure, the press will be stopped. The fault time is the countdown in seconds. Suggested value is 20 seconds.

Transducer Full Scale This value depends on the full scale rating of the pressure transducer being used. All pressure transducers must have a 4 to 20 milliamp output. The "Transducer Full Scale" is the pressure that the transducer is reading when its output is 20 milliamps. It is suggested that the full scale rating of the transducer be at least two times the maximum air pressure rating of the counterbalance. Since counterbalance air pressure is not constant and increases as the slide approaches bottom dead center, a transducer rating of at least two times maximum air pressure is suggested.

Section 4.2.1.2 Configuring Cushion Systems

The cushion configuration screen is shown in Figure 4.5.

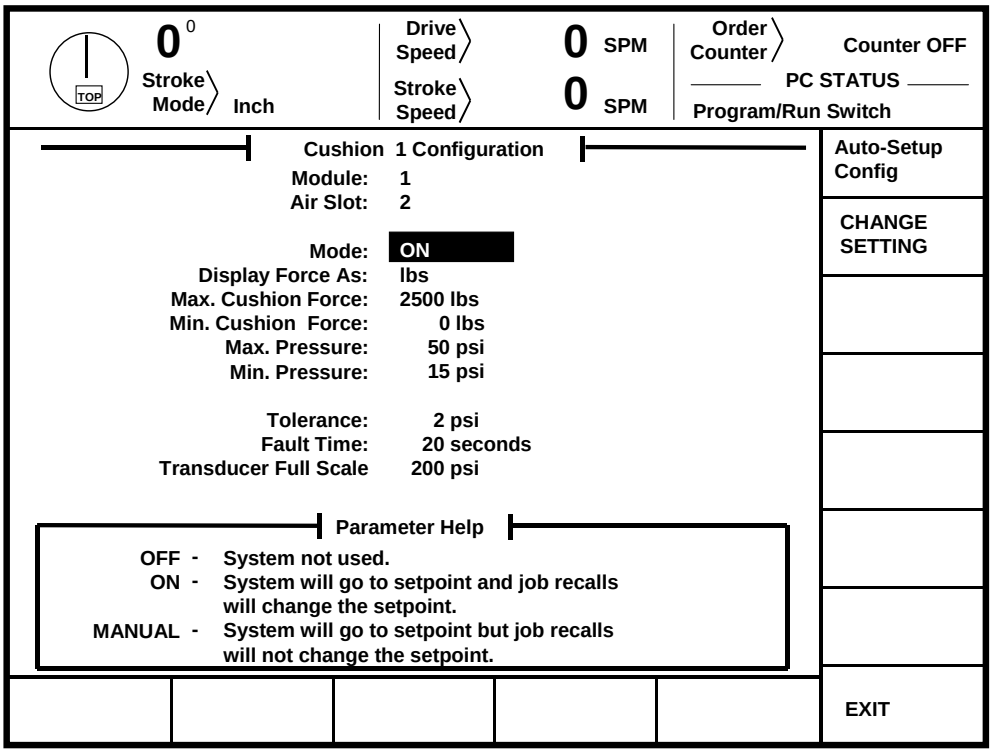

Figure 4-5 Cushion Configuration

There are several parameters that must be configured in this screen. The editing cursor indicates which parameter is currently selected. Softkey 1 (the uppermost vertical softkey) will change its description based on the parameter and, when pressed, allows the currently selected parameter to

be changed. The up and down arrow keys move the editing cursor from one parameter to another. *See Appendix A for examples of setting up each kind of system.* The features of this screen are:

Help — The "Help" box at the bottom of the screen changes depending on the parameter that the editing cursor is currently on. It gives a short version of how the parameter is used.

Module — Corresponds to the number of the Automatic Setups module that is currently being configured. Typical systems will have only one module. Up to four modules can be connected to one OmniLink II Press Automation Control or OmniLink 5000 Press Control.

Air Slot — Corresponds to the physical slot number (AS2 in the example of Figure 4.3) selected for configuration on the auto-setup card.

Mode — Use the CHANGE MODE soft key to cycle the status from *ON* to *MAN* to *OFF* and back to *ON*. *ON* means the module will automatically adjust the air pressure when a job is recalled to the air pressure associated with that job. *MAN* means the module will automatically adjust the air pressure, but the pressure can only be changed from the Auto Setup screen by entering the desired air pressure. A recalled job will NOT change the pressure if you configure the module to *MAN*. *OFF* means the module will not control the air pressure. This value should typically be set to *ON*.

Display Force As — Set this parameter to the units that die cushion force should be displayed in. The choices are pounds (lbs), kilograms (Kgs), tons, and metric tons (Mtons). Note that the display unit can be changed at any time. If a job was stored in tons, and this unit is changed to pounds, the stored job will still be correct. For example, if 2 tons were stored for a job and the display unit is changed to pounds, when the job is recalled it will be set to 4000 pounds.

Max. Cushion Force — This should be set to the cushion force generated at its maximum pressure.

Min. Cushion Force — Set this value to the force generated at the Min. Pressure you have selected. See *Min. Pressure* below.

Max. Pressure — This value should be set to the maximum operating air pressure at which the cushion is designed to operate. This should be the maximum operating pressure specified by the cushion manufacturer.

Min. Pressure — This value should be set to the minimum operating pressure at which you will operate the cushion. The Min. Pressure should be set to at least the value that just barely supports the weight of the cushion cylinder. This can be found by slowly increasing the pressure to the cushion until it just starts to rise. Then back off the pressure until it just starts to fall. The Min. Pressure should be set to at least the average of the two pressures. The

Type “B” and “C” valve systems may be used to provide a minimum pressure through their manual regulator. This keeps the cushion from falling due to air leakage when the control is powered off and prevents cushion pins from falling through the lower die shoe and bolster.

NOTE! Cushions can always drift down when the plant air supply is off. Also, if a type “B” valve is used, Min Pressure must be set above the manual regulator setting.

Tolerance This is the amount by which the system will allow the pressure to vary and still be considered “good”. For instance if tolerance is 2, then a setting of 30 psi will be considered “At Pressure” from 28 to 32 psi. Suggested setting is 2.

Fault Time If the pressure in the cushion goes out of tolerance due to a leak or any other reason, a countdown starts. The control will try to bring the pressure back into tolerance before the countdown expires. If it cannot correct the pressure, the press will be stopped. The fault time is the countdown in seconds. Suggested value is 20 seconds.

Transducer Full Scale This value depends on the full scale rating of the pressure transducer being used. All pressure transducers must have a 4 to 20 milliamp output. The “Transducer Full Scale” is the pressure that the transducer is reading when its output is 20 milliamps. It is suggested that the full scale rating of the transducer be at least two times the maximum air pressure rating of the cushion. Since cushion air pressure is not constant and increases as the slide approaches bottom dead center, a transducer rating of at least two times maximum air pressure is suggested.

Section 4.2.2 Configuring Slide Adjust Modules

The OmniLink II Press Automation Control Automatic Setups module can control press slide shut height. To start the configuration process for an installed slide shut height adjust system, the hardware slot must be told which of two possible slide shut height adjust systems it is to control. Either Slide Adjust 1 or Slide Adjust 2 can be controlled by the system. In Figure 4.3, Slide Slot 1 has already been assigned for control of a Slide 1. If it is necessary to add, change, or modify an Slide Slot assignment, move the cursor to the Air Slot to be modified and press the CHANGE SETTING softkey. A list of available assignments, Slide 1 or Slide 2 for the Slide Slot will appear. Move the cursor to the desired assignment and press the SELECT softkey. The majority of applications will have only one slide adjust system. These applications should have Slide 1 selected.

Section 4.2.2.1 Configuring a Rotary Slide Adjust System

After a control function has been assigned to a Slide Slot, the system must be configured. This configuration sets parameters, such as minimum shut height, maximum shut height, and

tolerance limits. To configure a particular air system, move the cursor to that system and press the CONFIGURE SYSTEM softkey.

The slide adjust configuration screen is shown in Figure 4.6.

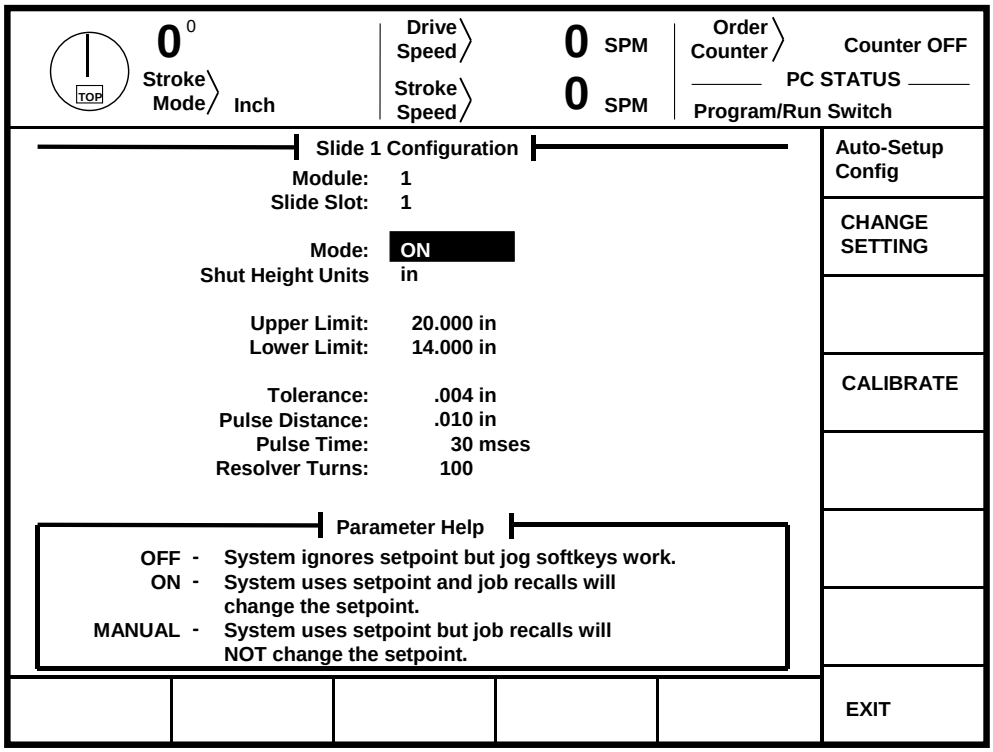

Figure 4-6 Slide Configuration Screen

There are several parameters that must be configured in this screen. The editing cursor indicates which parameter is currently selected. Softkey 1 (the uppermost vertical softkey) will change its description based on the parameter and, when pressed, allows the currently selected parameter to be changed. The up and down arrow keys move the editing cursor from one parameter to another. *See Appendix A for examples of setting up each kind of system.* The features of this screen are:

Help — The "Help" box at the bottom of the screen changes depending on the parameter that the editing cursor is currently on. It gives a short version of how the parameter is used.

Module — Corresponds to the physical Automatic Slide Adjust module number to which the slide adjust module is currently connected. This is a display parameter only and cannot be changed.

Slide Slot — Corresponds to the physical slot number, SS1 or SS2, to which the slide adjust module is currently plugged into. This is a display parameter only and cannot be changed.

Mode Use the CHANGE MODE softkey to cycle the status from *ON* to *MAN* to *OFF* and back to *ON*. *ON* means the module adjusts to the new shut height associated with a job when that job is recalled from memory, but **only** if the Slide Adjust OFF/ON selector switch is turned to the ON position. *MAN* means the module can control the shut height but the shut height can only be changed from the "Slide Adjust" screen or with the Jog-Up and Jog-Down remote pushbuttons. A **RECALLED** job will **NOT** change the shut height, although an operator can cause the system to automatically adjust to a new shut height by turning the Slide Adjust OFF/ON switch to the ON position, entering the desired shut height value in the "Slide Setpoint" row, and pressing the AUTO ADJUST softkey. *OFF* means the module will not automatically adjust the shut height, and will ignore any errors from the system. Operators can always manually jog the slide into position through the use of the JOG UP and JOG DOWN softkeys. These keys appear when the Slide Adjust OFF/ON switch is in the ON position regardless of whether *ON*, *MAN*, or *OFF* is configured. This value should typically be set to ON.

Shut Height Units All shutheight parameters and the shut height actual position can be displayed and entered in inches or millimeters. Use the CHANGE UNIT softkey to toggle this setting between inches and millimeters. Note that values already entered will be converted to the new unit.

Upper Limit This value is an electronic upper limit for the slide adjust system that acts as a backup for the mechanical up limit switch. The automatic shut height system will not adjust the shut height above this value, which should be set just below where the mechanical up limit switch open up.

Lower Limit This value is an electronic lower limit for the slide adjust system that acts as a backup for the mechanical down limit switch. The automatic shut height system will not adjust the shut height below this value, which should be set just above where the mechanical down limit switch opens up.

Tolerance This value determines how far off the slide can be from the slide setpoint and still be considered "In Position". Recommended initial value is .004" (.10mm). While the automatic slide adjust system will normally make its initial adjustment to within .001" (.02mm) of the selected setpoint value, the impact created by the stamping operation may cause the shut height to change slightly as clearances in gears and threads of the slide adjustment mechanism shift. If the design or condition of the press causes the shut height to change by more than the tolerance (measured at the top of the stroke) after stamping begins, the tolerance must be set to a higher value. It may also be possible to set this value lower on some presses.

Pulse Distance The automatic slide adjust is always accomplished by going above the desired shut height setpoint value and descending to the setpoint value. The pulse distance value must be set to cause the slide adjust system to

make a preliminary stop slightly **above** the desired setpoint. The system will then incrementally "pulse" the slide adjust motor to achieve the desired slide setpoint position. The pulse distance value must be set by trial and error. A good starting point is .010" (.25mm). This value would turn off the slide adjust motor .010" (.25mm) above any setpoint entered before the pulse sequence would begin. The final stopping point will be **less** than .010" (.25mm) above the setpoint value, and **may** end up **below** the desired setpoint since electrical reaction times and mechanical inertia will cause the slide to travel slightly further after the signal to stop is given. The pulse distance selected is too large if the system has to pulse more than a few times to get into final position after the preliminary stop, and should be decreased. The pulse distance selected is too small if the system overshoots the desired slide setpoint position, and should be increased. No pulses will occur if this happens because the shut height will already be below the intended setpoint.

Pulse Time — The system pulses the slide adjust motor starter when it gets close to where it wants to go in order to do fine positioning, i.e., after making the preliminary stop determined by the pulse distance. The pulse time must be set by trial and error. A good starting value for this parameter is 30 msecS (milliseconds or 1/1000 of a second). If the system cannot pulse into position during an auto adjust sequence, then this value should be increased. A pulse time that produces an average change of about a half a thousandth of an inch in shutheight for each pulse is desirable. Too long a pulse time will result in overshooting the setpoint limit by an unacceptable amount. Reduce the pulse time if significant overshoot occurs.

Resolver Turns — This parameter should be set to the number of turns for the dual resolver being used for slide height position feedback. Normal setting for this unit are 100 or 180 turns. See Table 4.1.

Table 4.1: Resolver Turns

Manufacturer	Model #	Turns
AMCI	HTT-20-100	100
AMCI	HTT-20-180	180
AMCI	HTT-20-1000	100
AMCI	HTT-20-1800	180

Section 4.2.2.2 Calibrating a Rotary Slide Adjust System

After setting the parameters in the previous section, the rotary slide system must be calibrated before it can be used.

IMPORTANT!	Configuring/calibrating the slide adjust module should **only** be done with no dies installed in the press **and,** for presses equipped with slide counterbalance systems, should proceed **only** after the counterbalance is properly adjusted to offset the weight of the slide. If counterbalance pressure is too low, bearing clearances will cause shut height measurements made during calibration to be too small.

WARNING!	**Since the slide adjust configuration procedure requires measurements of the space between the press slide and bed or bolster, this procedure must be preformed with no dies or tooling in the press to prevent the possibility of a point of operation or pinch point injury to personnel making the measurement. Failure to heed this warning may result in serious injury or death.**

To calibrate a rotary slide adjust system:

a) Make sure the upper and lower limit settings have been set correctly in the slide configuration screen of Figure 4.6.

NOTE:	It us absolutely critical to set the upper and lower limits correctly before calibrating a rotary slide adjust system. The calibration process uses this information to map the turns from the dual resolver into measurement space of the slide. **If the upper and lower limits are not set correctly, the system may fail to calibrate.**

b) Press the CALIBRATE SLIDE softkey in the slide configuration screen of Figure 4.6.

c) A screen will appear with a warning that calibrating the slide should not be undertaken without first reading this manual. Press the CONTINUE SLIDE CAL. softkey to continue the calibration process or EXIT to return to slide configuration.

d) The next screen will give instructions for positioning the slide at bottom dead center. This is usually accomplished by stroking the press in Inch mode to position the press slide at the bottom of the stroke. This is not adjusting the slide shut height to its bottom position. This is moving the slide to the bottom of its stroke. This is bottom dead center, which is usually equivalent to a crankshaft position of 180°. **This screen also warns that this is the last chance to abort the calibration procedure without destroying the results of a previous calibration**. If this is an initial calibration, this warning does not apply, because there was no previous calibration.

NOTE:	It is **very important** make as accurate a measurement as possible for the Upper and Lower Calibration Points. If these measurements are wrong, then the slide position reported by the system will also be wrong!

e) The system now needs an upper calibration point. With the press slide as near as possible to bottom dead center (180 degrees), use the JOG UP and JOG DOWN softkeys to take the slide near the top of the adjustment range. The slide should be slightly lower than the upper limit that was entered on the slide configuration screen. Take the measurement of the shut height in this position as carefully and accurately as possible and **without moving the slide** enter the number as requested on the screen.

Press the CONTINUE SLIDE CAL. softkey to continue the calibration process or EXIT to return to slide configuration.

f) Finally, the lower calibration point must be set. Use the JOG UP and JOG DOWN softkeys to take the slide near the bottom of the adjustment range. The slide should be slightly higher than the lower limit entered on the slide configuration screen. Take the measurement of the shut height in this position as carefully and accurately as possible and **without moving the slide** enter the number as requested on the screen.

NOTE:	It is **very important** make as accurate a measurement as possible for the Upper and Lower Calibration Points. If these measurements are wrong, then the slide position reported by the system will also be wrong!

Press the CONTINUE SLIDE CAL. softkey to continue the calibration process or EXIT to return to slide configuration.

g) The slide system should now be calibrated. **Check for proper operation** by running the slide up near the top of the adjustment range and checking the slide position reported. Repeat this process with the slide near the bottom of the adjustment range.

WARNING:	**After calibration always check for proper operation of the slide adjust system as wiring or transducer faults could cause an invalid calibration. Bad measurements could result in damage to the machine and tooling, and can cause injury or death.**

Section 5 Operation

The purpose of the Automatic Setup module is to allow automatic adjustment of such press systems as air counterbalances, air cushions, air operated hydraulic overloads, and slide adjust systems to greatly reduce setup time for different jobs, and to help ensure that these systems are adjusted correctly for different jobs.

All operation of auto-setup functions, other than automatic adjustments to previously stored values when the OmniLink II Press Automation Control or the OmniLink 5000 Press Control recalls a job, start from the Auto-Sets screen. This screen is displayed when the AUTO SETS softkey on the Main Menu or Press Control screen is pressed. The Auto-Sets screen shows all configured functions and allows their settings to be adjusted. Figure 5.1 shows an example Auto-Sets screen. Note that each configured function (slide adjust, counterbalance, or cushion) has its own box with name, settings, position or pressure, status, and fault.

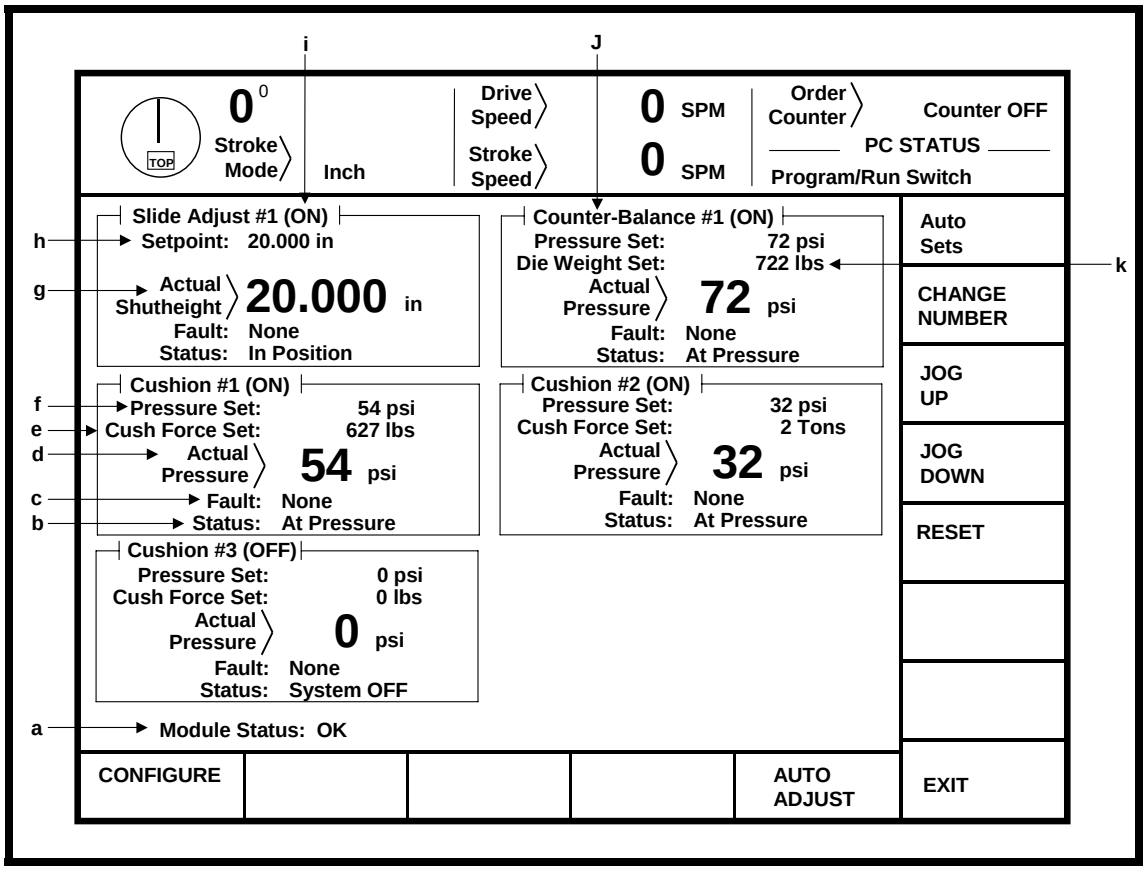

Figure 5-1 Example Auto-Setups Operation Screen

The main features of this screen are:

a) The module status gives the overall status of the auto setup module as a whole instead of the status of a single sub-system, such as a counterbalance. When the module is functioning properly, thus should read “OK”. See section 6.1 for other diagnostic messages.

b) Each configured sub-system has a status. Under normal conditions, this status will read "At Pressure" for air-based sub-systems such as counterbalances that are within the tolerance setting of the set pressure. Slide sub-systems will read "In Position" when within the tolerance setting for the shut height setpoint. See section 6 for an explanation of all status messages for the various sub-systems.

c) Each configured sub-system has a fault message. Under normal conditions, this fault should read "None". See section 6 for an explanation of all fault messages for the various sub-systems.

d) Air pressure controlled sub-systems (counterbalances and cushions) display the current actual pressure for that system in large numbers for easy visibility.

e) Cushions allow the setpoint pressure to be entered directly in psi or to be set in force. This force can be pounds, kilograms, tons, or metric tons depending on how the system is configured. The configuration parameters (see Section 4.2.1.2) allow the system to convert from force to psi automatically.

f) Air pressure controlled sub-systems (counterbalances and cushions) have a pressure setpoint in psi. This number is the intended pressure for that system.

g) Slide adjust system show the shut height reported by the transducer in large numbers for easy visibility. This number will be in inches or millimeters depending on how the system is configured (see section 4.2.2 for details).

h) The slide setpoint is the desired shut height for a slide in inches or millimeters depending on how the system is configured (see section 4.2.2 for details).

i) Each configured sub-system has an indicator that tells what mode the system is in - ON, OFF, or MANUAL (see section 4 for details on the mode).

j) Each configured sub-system is named at the top of the box in which its parameters and settings are shown.

k) Counterbalances allow the setpoint pressure to be entered directly in psi or to be set in terms of die weight. This weight can be pounds, kilograms, tons, or metric tons depending on how the system is configured. The configuration parameters (see Section 4.2.1.1) allow the system to convert from weight to psi automatically.

There are a number of softkeys in this screen:

"CHANGE NUMBER" This key allows the parameter that the editing cursor is currently on to be changed. The editing cursor may be placed on a parameter using the up, down, left, and right arrow keys. This key is not always available depending on the access code configuration as defined in Section 2.

"CONFIGURE" — Allows the individual options such as counterbalance, cushion, and slide adjust modules to be configured during initial installation of the system and will not be used for production operation setup. Note that this key is only available when the RUN/PROG keyed switch is in the PROG position.

"JOG UP" — Press this softkey to move the slide up. A momentary push will "pulse" the slide up once for fine control. If the key is held down for more than about ½ a second, the slide will move up continuously until the key is released.

"JOG DOWN" — Press this softkey to move the slide down. A momentary push will "pulse" the slide down once for fine control. If the key is held down for more than about ½ a second, the slide will move down continuously until the key is released.

"AUTO ADJUST" — Press this softkey to automatically move the slide to the setpoint. An auto adjust sequence always goes above the setpoint and then comes down to it for consistency. Note that when an auto adjust sequence is in progress, this key will change to CANCEL AUTO ADJUST. When pressed under this circumstance, it will cancel the auto adjust sequence and cause slide motion to stop.

"RESET" — Certain errors will cause the auto setup module to generate a top stop or cycle stop to the press. When this occurs, the RESET softkey will appear. Before the press can be started again, the fault must be corrected and this key must be pressed to clear the error condition. Note that this is a restricted operation and an access code may be required depending on system configuration as detailed in Section 2.

Section 5.1 Slide Adjust Operation

Each configured slide system has its own "box" on the screen (Figure 5.1 shows a setup with only one slide adjust system). The title of the box has the shut height system name and the mode the system is in (ON, OFF, or MANUAL). This box contains:

Setpoint — The *desired* position of the slide shut height adjustment. This number may be changed by manual operator entry when the operator has access via key or user code depending on the configuration of the system as detailed in Section 2. The setpoint will also be changed to the required slide setpoint for a previously stored job when that job setup is recalled from memory and the system is ON. The units for this setpoint can be in inches or millimeters depending on the configuration. See section 4.2.2 for details.

Actual Shutheight — The *actual* position of the slide shut height adjustment as indicated by a

linear or rotary transducer mounted on the slide system of the press. The units for the position can be in inches or millimeters depending on the configuration. See section 4.2.2 for details.

Fault — If the slide adjust system detects an error it will be reported on this line. A fault occurs when a hardware or firmware problem is diagnosed by the system. See section 6 for fault messages and their meanings.

Status — The current status of the slide adjust system. Status messages indicate what the system is doing in the normal course of its operation. See section 6 for status messages and their meanings.

Section 5.1.1 Slide On, Manual, and Off Settings

The Auto-Setup module allows three modes of operation to be chosen in the configuration menu for each slide adjust system - “ON”, “MAN” (manual), or “OFF”. ON is the proper mode for the normal intended use of the system.

The operator or setup person cannot change the mode in the operation screen but the setting is reported at the top of the slide adjust box after the slide name (“Slide Adjust #1" or “Slide Adjust #2") for convenience.

The mode setting affects the operation of the slide system in the following ways:

“ON” — Jobs that are recalled will automatically move the slide to the position stored in the job subject to the conditions described in Section 5.1.2. The AUTO ADJUST softkey can be used to initiate automatic movement of the slide to the currently programmed setpoint. The JOG UP and JOG DN softkeys can be used to manually move the slide.

“MAN” (manual) — This mode can be chosen if there is some reason the employer does not want to allow recall of previously stored job setups from memory. The slide position will not automatically change when a job is recalled. The slide setpoint can still be changed by manual entry of the desired setpoint and by pressing the AUTO ADJUST softkey to initiate an auto adjust sequence. The JOG UP and JOG DN softkeys can be used to manually move the slide.

“OFF” — The slide position will not automatically change when a job is recalled. No automatic movement will occur even if the AUTO ADJUST softkey is pressed. The JOG UP and JOG DN softkeys will still move the slide. This mode is provided to allow temporary reversion to completely manual adjustment of shut height by use of the JOG UP and JOG DN softkeys if the slide mounted transducer fails.

Section 5.1.2 Automatic Slide Movement

Automatic movement of the slide can be initiated by either pressing the AUTO ADJUST" softkey in the slide adjust screen or when a stored job is recalled and the system is ON. Note that the AUTO ADJUST key will only appear when the slide adjust switch is ON. An auto adjust sequence always approaches the slide setpoint from above. For instance, if the current position is 10.000 and the slide setpoint is 12.000, the auto adjust sequence might take the slide first to 12.015, then back to 12.004, and then "pulse" the slide the last four thousandths into position. This is to ensure consistent setups by taking up gear lash from the same direction every time. **Note that a slide setpoint of 00.000 (used to store a job that will not overwrite the previous slide setpoint on recall), will prohibit automatic adjustment**. Automatic movement is subject to the following conditions:

a) The slide adjust switch must be on.

b) The press must be stopped.

c) The press must be at the top of the stroke.

d) When used with the OmniLink 5000 Press Control only, the Link Master Control (LMC) relay must be engaged.

e) There must be no faults in the slide system and the counterbalance system, if present.

f) The auto adjust sequence for the slide will not start until the counterbalance system, if present, is at least up to its pressure setpoint. If the **correct** pressure setpoint for the counterbalance has been entered, this will ensure that the counterbalance has taken up any clearances in the slide connection system to increase accuracy of shut height adjustment. When the slide adjust system waits for the counterbalance system to finish adjusting to its pressure setpoint, the status message of the slide adjust system will be "Waiting for Cntr-Bal".

NOTE:	A counterbalance pressure that is far too low or far too high during any shut height adjustment may place excessive load on the shut height adjust motor and may even stall the motor. This condition can also occur with non-automatic motorized slide adjust systems. If the automatic slide adjust doesn't see slide movement within two seconds of a command to move, it will stop its command to move and generate to the Fault message "Slide Did Not Move".

IMPORTANT!	Automatic movement will be terminated if the JOG UP softkey, JOG DOWN, or CANCEL AUTO ADJUST softkey is pressed while the slide is moving automatically. Automatic movement will pause if the slide adjust switch is turned off. It will resume when the slide adjust switch is turned back on.

Section 5.1.3 Manual Slide Movement

Manual slide movement can be controlled by the JOG UP and JOG DN softkeys or by the remote JOG UP and JOG DN pushbuttons.

Section 5.1.3.1 Manual Slide Movement by JOG UP & JOG DN softkeys

As noted in the section explaining the softkeys in the slide screen, the slide may be manually moved by pressing the JOG UP and JOG DN softkeys. These keys will work regardless of whether the slide system is on, off, or in manual mode. Note, however, that these keys will not override the mechanical up and down limit switches in the slide. In addition, these keys will not allow movement beyond the electronic limits entered in the configuration screen for the slide unless the slide system is "OFF".

Section 5.1.3.2 Manual Slide Movement by Remote Jog Up & Down Push Buttons

Optional remote Jog Up and Jog Down push buttons can be added to the slide adjust system. In order for these push buttons to change slide adjust, the Slide Adjust OFF/ON selector switch must be "ON." These remote push buttons will work regardless of whether the slide system is on, off, or in manual mode. Note, however, that these remote will not override the mechanical up and down limit switches in the slide. In addition, these buttons will not allow movement beyond the electronic limits entered in the configuration screen for the slide unless the slide system is "OFF".

Section 5.1.4 Slide Fault and Status

The last fault and current status of the slide system are displayed for diagnostic and informational purposes. Under normal conditions "Fault" should be "None". If there is a problem with the slide system, it will be reported here. "Status" gives the current state of the system such as "In Position", Slide Low", "Moving Up" etc. For the most part these messages will be self-explanatory. See section 6 for a complete list of fault and status messages with explanations.

Section 5.2 Air System (Counterbalance, Cushion, and Hydraulic Overload Operation

Counterbalances and cushions are all controlled by air pressure and as such are grouped as "air systems". Each configured air system has its own "box" on the screen (see Figure 5.1). The title of the box has the air system name and the mode the system is in (ON, OFF, or MANUAL). This box contains:

Pressure Set — The *desired* pressure of the air system in psi. This number may be changed by manual operator entry when the operator has access via key or user code depending on the configuration of the system as detailed in Section 2. It may also be automatically changed to the required pressure setpoint for a previously stored job when that job setup is recalled from memory and the air system is "ON".

Die Weight Set — For counterbalances only, the *desired* die weight to be counterbalanced by the air system. This number may be changed by manual operator entry when the operator has access via key or user code depending on the configuration of the system as detailed in Section 2. It will also be changed to the required die weight setpoint for a previously stored job when that job setup is recalled from memory and the air system is "ON". This number can be set in pounds, kilograms, tons, or metric tons depending on the configuration as detailed in Section 4.2.1.1.

Cush Force Set — For cushions only, the *desired* cushion force to be generated by the air system. This number may be changed by manual operator entry when the operator has access via key or user code depending on the configuration of the system as detailed in Section 2. It will also be changed to the required cushion force setpoint for a previously stored job when that job setup is recalled from memory and the air system is "ON". This number can be set in pounds, kilograms, tons, or metric tons depending on the configuration as detailed in Section 4.2.1.2.

Actual Pressure — The *actual* air pressure of the air system in psi as measured by a pressure transducer that is an input to the system.

Fault — If the air system detects an error it will be reported on this line. A fault occurs when a hardware or firmware problem is diagnosed by the system. See section 6 for a list of fault messages and their meanings.

Status — The current status of the air system. Status messages indicate what the system is doing in the normal course of its operation. See section 6 for a list of status messages and their meanings.

Section 5.2.1 Air System On, Manual, and Off Settings

An air system can be set in the configuration menu to modes of "ON", "MAN" (manual), or "OFF". The operator cannot change this mode setting in the operation screen but the setting is

reported on the top line after the air system name for operator information. The ON setting is the normal setting for each air system.

The mode setting affects the air system in the following ways:

"ON" — Jobs that are recalled from memory will automatically take the air system to the pressure stored in the job.

"MAN" (manual) — The air pressure will not automatically change when a job is recalled. The pressure or force setpoint can still be changed by manually entering a desired pressure setpoint.

"OFF" — The air pressure will not automatically change when a job is recalled. The Automatic Setups module will not control the air pressure in any way. For units equipped with an integrated valve with manual fallback, the manual side will be engaged and pressure can be adjusted through a manual regulator.

Section 5.2.2 Pressure and Force Setpoints

Pressure can be set in one of two ways. First, if the air system was correctly configured, the desired force which the pressure is to create can be entered in the "Force Setpoint" row on the air pressure screen. Second, if preferred, the desired air pressure in psi may be entered into the "pressure setpoint" row.

For counterbalances, the "Die Weight Set" is the weight of the upper die that attaches to the slide. (The counterbalance must also offset the weight of the press slide, but since this is a constant accounted for when the system is configured, only the upper die weight need be entered). The upper die weight, which is required by OSHA to be stamped on the die, can be entered in the force setpoint row.

For cushions, the "Cush Force Set" is the amount of "push" that is exerted by the air pressure times the cylinder area.

Note that pressure, die weight, and cushion force are restricted items as defined in Section 2. The RUN/PROG key, a user code, or both may be required to change them. If a force setpoint is entered, the proper pressure in psi will be calculated and applied to the system. Likewise if pressure is entered, the force setpoint will be calculated and displayed.

Section 5.2.3 Cushion Dump Operation

Cushion dump can occur if the cushion dump input, IN 3, is switch on, 24 V. Wiring of the cushion dump is explained in Section 3.4.3. If this input is switched on, the cushion dump solenoid will turn on. If a Type "B" valve is being used for cushion pressure control, the cushion pressure will go to the **minimum** value set by the manual regulator (as long as there is shop air pressure.) If a type "A" or "C" valve is being used, the cushion pressure will go to zero.

Section 5.2.4 Air System Fault and Status

The last fault and current status of the air system are displayed for diagnostic and informational purposes. Under normal conditions the "Fault" message should be "None". If there is a problem with an air system, it will be reported on the "Fault" line. "Status" gives the current state of the system such as "At Pressure", "Filling", "Dumping" etc. For the most part these messages will be self-explanatory. See section 6 for a complete list of fault and status messages with explanations.

Section 5.3 Job Storage and Recall Issues

There are a few things to keep in mind for job storage and recall:

a) A store operation must be done for the current air pressure and slide adjust setpoints to be stored in the job number. If you recall a job and then change one or more of the recalled setpoints, the changed setpoints will **not** be stored for later recall **unless** you store the job again while the setpoints are set at the new value.

b) Since one or more cushions may or may not be used with any given die, the On/Off status of each cushion system is stored with the job. For example, Job #1 is stored with "Cushion #1" turned off. Next, Job #2 is stored with "Cushion #1" turned on. Every time Job #1 is recalled, "Cushion #1" will be turned off. Every time Job #2 is recalled, "Cushion #1" will be turned on. **Note that if the cushion system is in manual mode then the above does not apply!**

c) If a job is recalled when the press is not at the top, the slide adjust system will display a status of "Waiting for Top". When the press does reach the top, the Slide OFF/ON selector switch is "ON," and all other necessary conditions are satisfied, the slide will go to the slide setpoint.

d) If a job is recalled when the slide adjust switch is not on, the slide adjust system will display a status of "Waiting S/A Switch". When the slide adjust switch is turned on and all other necessary conditions are satisfied, the slide will go to the slide setpoint.

e) When a job is recalled, the slide will not complete the auto adjust sequence until the counterbalance system, if present, has at least reached operating pressure. While the slide is waiting it will display a status of "Waiting for Cntr-Bal". This allows the counterbalance to take up any clearances in the system for a consistent setup.

f) If a slide adjust system is stored in a job with a slide setpoint of 0, then when that job is recalled the current setpoint will not be replaced and the slide will not move. This is to accommodate intermediate jobs in a setup that may need to cycle cushion and counterbalance pressures before the slide moves.

Section 6 Diagnostics - Fault and Status Messages

When the press control screen reports a stop condition that indicates the auto-setup board asserted or is asserting a stop signal, the "Auto-Sets" screen module status and the individual sub-systems status line will give additional information.

Section 6.1 Main Module Messages

OK — General Module status is ok. This does not mean that the individual sub systems such as shut height control, counterbalance, and cushion control are ok.

Bad Config Data — The configuration data stored in non-volatile ram was corrupted. The Automatic Setup card will need to be reconfigured after pressing the reset error key in the "Auto Sets" screen.

Press Running at Startup — During the Automatic Setup module's power-up sequence, the module detected that the clutch is engaged (the press is running). The normal cause for this error is momentary power loss to the Automatic Setup module.

No Resolver Information — The Automatic Setup module receives crankshaft position over the High Speed Serial Bus. If this error is issued, the Automatic Setup module has momentarily lost receipt of the crankshaft position. The normal cause for this error is a bad connection of the High Speed Serial Bus cable or that the card rack is powered down but the Automatic Setup module is not.

Boot Info Corrupt — The Automatic Setup module has a corrupt Boot information block. The normal cause for this error is a hardware failure.

Boot Program Corrupt — The Automatic Setup module has corrupt Boot code. The normal cause for this error is a hardware failure.

Main Program Corrupt — The Automatic Setup module has corrupt Program code. The normal cause of this error is a hardware failure or the interruption of a program update. If the program update process is interrupted (by loss of power etc), the OIT will normally restart the update process when it is powered back up.

Module in Boot Mode — The Automatic Setup module is in boot program execution mode. This is normally the case during a main program update.

Memory Check Failed — The memory on the Automatic Setup module failed a memory check. The normal cause for this error is a hardware failure.

Initializing The Automatic Setup module is receiving its settings from the operator terminal. This message is normally seen only for a brief time.

Section 6.2 Counterbalance and Cushion "Fault" Messages

None No error present

Transducer Fail The pressure transducer gave a reading that is out of its normal range or gave no reading at all. Check that the transducer cable is still plugged in. If it is, check for cable damage. If the cable checks out the transducer may need to be replaced.

Could not Fill The system was unable to make progress when trying to raise the air pressure. This could be a bad connection to the fill valve, a failed fill valve, or no plant air pressure. Probably the most common cause would be a bad air leak in the system.

Could not Dump The system was unable to make progress when trying to lower the air pressure. Probably a bad connection to the dump valve or a failed dump valve.

Max. Press. Exceeded The air pressure exceeded the maximum pressure programmed in the configuration menu. Probably indicates a leaking fill valve or bad wiring causing the fill valve to be on too long.

Not at Min. Pressure The air pressure is not at the minimum pressure programmed in the configuration menu.

A/D converter Fail The A/D converter on the base card of the auto-setup module is not responding correctly. This will prevent operation of all air controlled systems. If the air system is using a type "C" valve (see Section 3.1), it can be turned OFF in the configurations screen and will revert to manual control.

Config Data Bad The configuration data for this system was corrupted. The information in the configuration menu for this system must be reentered.

Pressure Switch Low There is a pressure switch on the input air supply to the air valves. If the input air pressure is too low then the system could open the fill valve intending to raise the pressure but instead vent some air back into the air supply. The system will not fill as long as the pressure switch is low.

Sys not Detected The hardware necessary for the system cannot be detected. For example if it was attempted to turn on an air system AS1 and an air system card was not installed in slot AS1, this error would appear. This could be either defective hardware or missing hardware.

Section 6.3 Counterbalance and Cushion "Status" Message

At Pressure	The air system is within tolerance of its target pressure.
Filling	The system is filling (raising the air pressure).
Dumping	The system is dumping (lowering the air pressure).
Pressure High	The air pressure in the system is too high.
Pressure Low	The air pressure in the system is too low.
System Off	The system has been turned off in the configuration menu. The pressure will still be displayed if the transducer is working properly. In addition, if the system is equipped with a type "C" integrated valve (see section 3.1), the air pressure may still be adjusted with the manual regulator.
Vented	A pressure setpoint of 0 psi was entered for an air system. The dump valve is left open in this position. This is a stop condition for the counterbalance system.

Section 6.4 Slide Adjust "Fault" Messages

None	No errors present
Up/Down Reversed	The "Up" relay has been connected to the "Down" side of the motor starter and vice versa. The system checks position when moving the slide and generates this message if it goes in the opposite direction from that intended.
Slide Did Not Move	If the slide does not move within approximately 2 sec this error will be generated. Possible causes are counterbalance pressure so far off that the slide adjust motor cannot overcome it, wiring problems, starter overloads, a picofuse blown on the slide adjust board, or other mechanical failures.
Up Relay Open	The "Up" solid state relay on the slide adjust board failed open. Indicates a hardware failure of the relay.
Up Relay Shorted	The "Up" solid state relay on the slide adjust board failed shorted. Indicates a hardware failure of the relay.
Down Relay Open	The "Down" solid state relay on the slide adjust board failed open. Indicates a hardware failure of the relay.

Down Relay Shorted	The "Down" solid state relay on the slide adjust board failed shorted. Indicates a hardware failure of the relay.
Lock Relay Open	The "Lock" solid state relay on the slide adjust board failed open. Indicates a hardware failure of the relay.
Lock Relay Shorted	The "Lock" solid state relay on the slide adjust board failed shorted. Indicates a hardware failure of the relay.
Transducer Fail	The fine resolver on a rotary system could not be read correctly. This could be a cable problem, unplugged connector, failed resolver, or option board (5100-10C) problem.
Rot Crs Read Fail	The coarse resolver on a rotary system could not be read correctly. This could be a cable problem, unplugged connector, failed resolver, or option board (5100-10C) problem.
Rot Track Error	The resolver on a rotary transducer has an error tracking the information from the rotary input. This is usually caused by a faulty cable or a bad rotary transducer.
Rot Bad Low Read	The data read from the rotary transducer is inaccurate in the lower data segment. This is usually caused by a circuit board problem.
Rot Bad High Read	The data read from the rotary transducer is inaccurate in the higher data segment. This is usually caused by a circuit board problem.
Rot Speed Error	The data read from the rotary transducer indicates that the input shaft is traveling too fast. It may be necessary to gear down the input shaft of the rotary transducer or connect the transducer to a slower shaft from the slide adjust mechanism.
Rot Turns Exceeded	The number of turns of the rotary transducer has exceeded the capabilities of the system. It may be necessary to gear down the input shaft of the rotary transducer.
Rot ITCnt Bad	The incremental turn count value for the rotary transducer read from the system memory at power-up is not valid. This typically indicates a problem with the memory device on the main circuit board (5100-10).
Rot IT/Crs Drift	(Rotary Incremental Turns Count/Coarse Drift) - The data from the rotary transducer indicates that the incremental turn count and the reading from the coarse resolver do not match. This can occur if the rotary transducer moved while the Automatic Setup module was powered down or disconnected from the transducer. A bad cable or a bad rotary transducer can also cause this fault.

Sys not Detected The hardware necessary for the system cannot be detected. For example if it was attempted to turn on a slide adjust system SS1 and a slide adjust system card was not installed in slot SS1, this error would appear. This could be either defective hardware or missing hardware.

Section 6.5 Slide Adjust "Status" Messages

In Position The slide is within tolerance of the slide setpoint.

Up Lim Switch The slide has hit the mechanical up limit switch and can go no higher.

Down Lim Switch The slide has hit the mechanical down limit switch and can go no lower.

Upper Limit The slide has gone as high as the max position programmed in the configurations menu and will not be allowed to go higher.

Lower Limit The slide has gone as low as the min position programmed in the configuration menu and will not be allowed to go lower.

Moving Up The slide is moving up.

Moving Down The slide is moving down.

System Off The slide adjust system is turned off. The slide can still be manually moved by using the jog up and jog down buttons. The slide position will still be shown if the position transducer is still functioning correctly.

AM-Waiting for CBAL (Auto-Move Waiting for Counterbalance) - The automatic move function of the slide adjust system is waiting for the counterbalance to come to its correct pressure before automatically moving the slide.

AM-Waiting Top (Auto-Move Waiting for Top) The automatic move function of the slide adjust system must be at the top of the stroke for automatic positioning to occur. If a job is recalled at the bottom of the stroke, this message will be displayed until the press is at the top.

AM-Waiting SA Sw (Auto-Move Waiting for Slide Adjust Switch) The automatic move function of the slide adjust system is waiting for the slide adjust switch to be turned on. The slide cannot move while the slide adjust switch is in the off position.

Slide High The slide is higher than the slide setpoint plus tolerance.

Slide Low The slide is lower than the slide setpoint minus tolerance.

Auto-Move Active The slide is automatically going to the programmed slide setpoint.

Ext Jog Up The optional external jog up button is active. The slide should be moving up.

Ext Jog Down The optional external jog down button is active. The slide should be moving down.

Section 6.6 Slide Adjust Messages Calibration Only

OK The slide adjust system calibration results are okay.

Upper Cal Pos MUST be GREATER than Lower Cal Pos The numeric value for the upper calibration position must be larger than the numeric value for the lower calibration position.

Rotary Fine1 Read Failed The rotary transducer value read from the fine resolver is invalid. This could be caused by a bad connection, a bad rotary transducer, or a hardware problem on the rotary circuit board (5100-10C).

Rotary Coarse Read Failed The rotary transducer value read from the coarse resolver is invalid. This could be caused by a bad connection, a bad rotary transducer, or a hardware problem on the rotary circuit board (5100-10C).

Rotary Fine2 Read Failed The rotary transducer value read from the fine resolver is invalid. This could be caused by a bad connection, a bad rotary transducer, or a hardware problem on the rotary circuit board (5100-10C).

Rotary Fine Reading Drifted The two values read from the fine resolver indicate that the rotary transducer may have moved at a calibration point. This could be caused by a bad connection or some unexpected movement at the rotary transducer.

Rotary Max Turns Exceeded The rotary transducer has exceeded the maximum number of revolutions. It may be necessary to gear down the input shaft of the rotary transducer.

Rotary Inc Turn Count Bad The incremental turn count stored in memory has been corrupted. This usually indicates a problem with the memory device on the main circuit board (5100-10).

Rotary Quad Read Bad The quadrant of the current resolver reading does not match the expected value. This could be caused by a bad connection or a hardware problem on the rotary circuit board (5100-10C).

Resolver Misaligned The fine and course resolvers are no longer in proper alignment. The rotary transducer may need to be checked or replaced.

Coarse/Inc Turn Count Out of Synch The incremental turn count does not match the coarse resolver turn count. This could be caused by a bad connection or a hardware problem on the rotary circuit board (5100-10C).

Rotary Transducer Read Failure The value read from the rotary transducer is invalid. This could be caused by a bad connection, a bad rotary transducer, or a hardware problem on the rotary circuit board (5100-10C).

Rotary Max Speed Exceeded The maximum number of revolutions per second has been exceeded. It may be necessary to gear down the input shaft of the rotary transducer

Unknown Transducer Type The automatic circuit board detection system has detected an unexpected type of circuit board. The firmware on the main board (5100-10) will need to be updated.

Appendix A Configuration Examples

This section of the manual will go though an example setup of each kind of system on a “typical” press. Each example assumes that the hardware installation has been completed and the system is ready for configuration.

The following examples assume the access system is using “Key Only” mode as described in Section 2. Other modes may require entering a user code to change certain parameters.

Section A.1 Example Counterbalance Configuration

This example assumes the counterbalance system has been wired to the option board at “AS1". First, some information needs to be gathered.

From the press counterbalance table mounted on the frame of the machine (or found in the press manual), we find that at zero die weight, the counterbalance pressure should be 25 psi. The maximum upper die weight for our example press is 7500 pounds. At that weight, the table says the pressure should be 78 psi.

The pressure transducer installed on the system is a Setra model C209 that has a pressure range of 0 to 200 psi and an output of 4 to 20 ma.

Now we go to the “Auto Sets” screen and with the RUN/PROG switch in PROG hit the CONFIGURE softkey.

Since the counterbalance pressure transducer and valves are wired in at “AS1", move the cursor to Air Slot 1. Press the CHANGE SETTING softkey. From the pop-up menu, select Counter-Balance 1 by moving the cursor to Counter-Balance 1 and pressing the SELECT softkey. We have now told the Automatic Setups module that Air Slot 1 is to control a counterbalance. We must now configure all the parameters associated with Air Slot 1 for the particular counter-balance and pressure transducer.

Press the CONFIGURE SYSTEM softkey. The Counter-Balance 1 Configuration menu will appear.

Temporarily set the mode to OFF. We will change this after all other parameters are set.

Set the Display Weight As to lbs.

Set Max. Die Weight to 7500. This is the maximum capacity of the counter-balance per the specifications listed above.

Set Min. Die Weight to 0. This is equivalent to have no upper die attached.

Set the Max. Pressure to 78 psi. Per the specifications listed this is the required pressure when the maximum die weight is attached to the slide.

Set the Min. Pressure to 25. Per the specifications listed this is the required pressure when there is no die attached to the upper ram.

Set the Tolerance to 2 psi.

Set the Fault Time to 20 seconds.

Set the Transducer Full Scale to 200 psi. Per the specifications listed, the pressure transducer that we are using has a full scale rating of 200 psi.

Finally, we go back to the Mode line and set the Mode to ON.

See section 5.2 for operation details.

Section A.2 Example Cushion Configuration

This example assumes the cushion system has been wired to the option board at “AS2". First, some information needs to be gathered.

From the press manual or cushion information plate we find that the effective area of the cushion is 100 square inches and the maximum operating pressure is 90 psi. This means that the cushion will exert 100 pounds of force for every 1 psi of cushion pressure (100 square inches * 1 pound per square inch). We also found out from experimentation that is takes about 3 psi to initially move the cushion, and that the cushion just starts to fall at 2 psi. This tells us that approximately 2 psi is required to overcome the weight of the cushion piston and pressure plate.

The pressure transducer installed on the system is a Setra model C209 that has a pressure range of 0 to 200 psi and an output of 4 to 20 ma.

Now we go to the “Auto Sets” screen and with the RUN/PROG switch in PROG hit the CONFIGURE softkey.

Since the cushion pressure transducer and valves are wired in at “AS2", move the cursor to Air Slot 2. Press the CHANGE SETTING softkey. From the pop-up menu, select Cushion 1 by moving the cursor to Cushion 1 and pressing the SELECT softkey. We have now told the Automatic Setups module that Air Slot 2 is to control a cushion. We must now configure all the parameters associated with Air Slot 2 for the particular cushion and pressure transducer.

Press the CONFIGURE SYSTEM softkey. The Cushion 1 Configuration menu will appear.

Temporarily set the mode to OFF. We will change this after all other parameters are set.

Set the Display Force As to lbs.

Set Max. Cushion Force to 8800 lbs. Remember that for every psi the cushion will generate 100 pounds of force. Since the maximum pressure is 90 psi and 2 psi is used to overcome the cushion weight, the max force will be (90 psi - 2 psi) * 100 square inches - or 8800 pounds. Of

course this data can also be obtained from the cushion manufacturer.

Set Min. Cushion Force to 0.

Set the Max. Pressure to 90 psi. This is the maximum cushion pressure.

Set the Min. Pressure to 2 psi. This is the value that just supports the weight of the cushion piston and pressure plate.

Set the Tolerance to 2 psi.

Set the Fault Time to 20 seconds.

Set the Transducer Full Scale to 200 psi. Per the specifications listed, the pressure transducer that we are using has a full scale rating of 200 psi.

Finally, we go back to the Mode line and set the Mode to ON.

See section 5.2 for operation details.

Section A.3 Example Rotary Slide Adjust Configuration

This example assumes the rotary slide adjust system has been wired at “SS1". First, some information needs to be gathered.

A 100 turn AMCI series dual resolver is mounted on the press slide.

From the nameplate on the press or the press manual, we find that the minimum shut height is 12.500 inches and the maximum shut height is 16.000 inches.

Since the slide adjust rotary transducer and slide adjust motor starter control are wired in at “SS1", move the cursor to Slide Slot 1. Press the CHANGE SETTING softkey. From the pop-up menu, select Slide 1 by moving the cursor to Slide 1 and pressing the SELECT softkey. We have now told the Automatic Setups module that Slide Slot 1 is to control a slide adjust system. We must now configure all the parameters associated with Slide Slot 1 for the particular press and rotary transducer.

Press the CONFIGURE SYSTEM softkey. The Slide 1 Configuration menu will appear.

Temporarily set the mode to OFF. We will change this after all other parameters are set.

Set the Shut Height Units to in (inches). After calibration, the units can be changed, if desired.

Set the Upper Limit to 16.000 inches. Per the specifications listed for the maximum shut height.

Set the Lower Limit to 12.500 inches. Per the specification listed for the minimum shut height.

Set the Tolerance to .004 in.

Set the Pulse Distance to .010 in.
Set the Pulse Time to 30 msecs (milliseconds).

Set the Resolver Turns to 100. A 100 turn dual resolver is being used to measure slide shut height.

Before calibrating the slide, we MUST make sure the slide is properly counterbalanced, if a counterbalance is used on our press. If the slide is not properly counterbalanced, the slide calibration will be flawed because clearances will not be taken up by the counterbalance.

Now we press the CALIBRATE SLIDE softkey to perform the actual slide calibration as described in section 4.2.2.2.

Now we take the press back to the top of the stroke. With the slide adjust switch on, "JOG UP" and "JOG DOWN" softkeys should be displayed in the slide configuration screen.

Using the jog keys, we raise the slide to verify that the upper mechanical limit switch works correctly. Be **very careful** as the slide approaches the true maximum shut height (16.000 inches in this example) as the upper limit switch may be inoperative or misadjusted. Replace or adjust the limit switch as necessary.

In the same way, we verify that the lower mechanical limit switch works correctly. Again for emphasis, be **very careful** as the slide approaches the true minimum shut height (12.500 inches in this example) as the lower limit switch may be inoperative or misadjusted. Replace or adjust the limit switch as necessary.

If desired, the Upper Limit and Lower Limit can be set to be more restrictive than the actual minimum and maximum shut heights. For rotary transducers, the upper and lower limits should **never** be set outside the actual minimum and maximum shut heights.

Now go back to the Mode line and set the Mode to ON.

The last thing we must do is verify that the "Pulse Distance" and "Pulse Time" settings work for our press. These settings affect how automatic adjustment works. We hit Exit twice to return to the Auto Setup screen and hit the RESET ERROR softkey, if necessary, to clear errors in the slide adjust system. We should see JOG UP, JOG DOWN, and AUTO ADJUST softkeys. Again we check to make sure the slide is properly counterbalanced. If it is not then the following tests will be meaningless. An under or over counterbalanced slide will not move the same way that a properly counterbalanced slide will.

For fine adjustment purposes, a momentary push of the JOG UP or JOG DOWN key will "pulse" the slide motor starter for "Pulse Time" seconds. Remember that the Slide Adjust OFF/ON selector switch should be in the ON position. We hit a jog key to see how far the slide moves with one pulse. Ideally, it should take around 2 pulses to move .001 inch. We hit the JOG DOWN key and find that it takes 5 pulses to move the slide .001 inch - too many. We change the Pulse Time value to ".04" sec. Repeating the test, we find that it now takes 1 to 2 pulses to

move .001 inch - an acceptable value.

Now it is time to use the AUTO ADJUST softkey. Enter a setpoint slightly above the current reading. Assume that the current shut height reading is 13.800 inches. Enter a setpoint of 14.000 inches. Remember that the Slide Adjust OFF/ON selector switch should be in the ON position. Press the AUTO ADJUST softkey. The slide moves up past 14.000 (the slide setpoint we entered in the operation screen) and stops momentarily at 14.025. It then comes back down and stops at 13.996. The Pulse Distance value is set too high. What should have happened is that the slide would go over 14.000, come back down to a position just over 14.000 - say 14.003 - and then pulse into position at 14.000. Since we went under our setpoint by .004 inches, we change the Pulse Distance to .017 inches (adding .004 for the undershoot plus .003 for good measure to the original value of .010). Now when we hit the AUTO ADJUST softkey the slide travels first to 14.039, stops momentarily, travels down to 14.003, and pulses the slide into position at 14.000 - perfect.

See section 5.1 for further details on slide adjust operation.

Appendix B Typical Wiring Diagrams

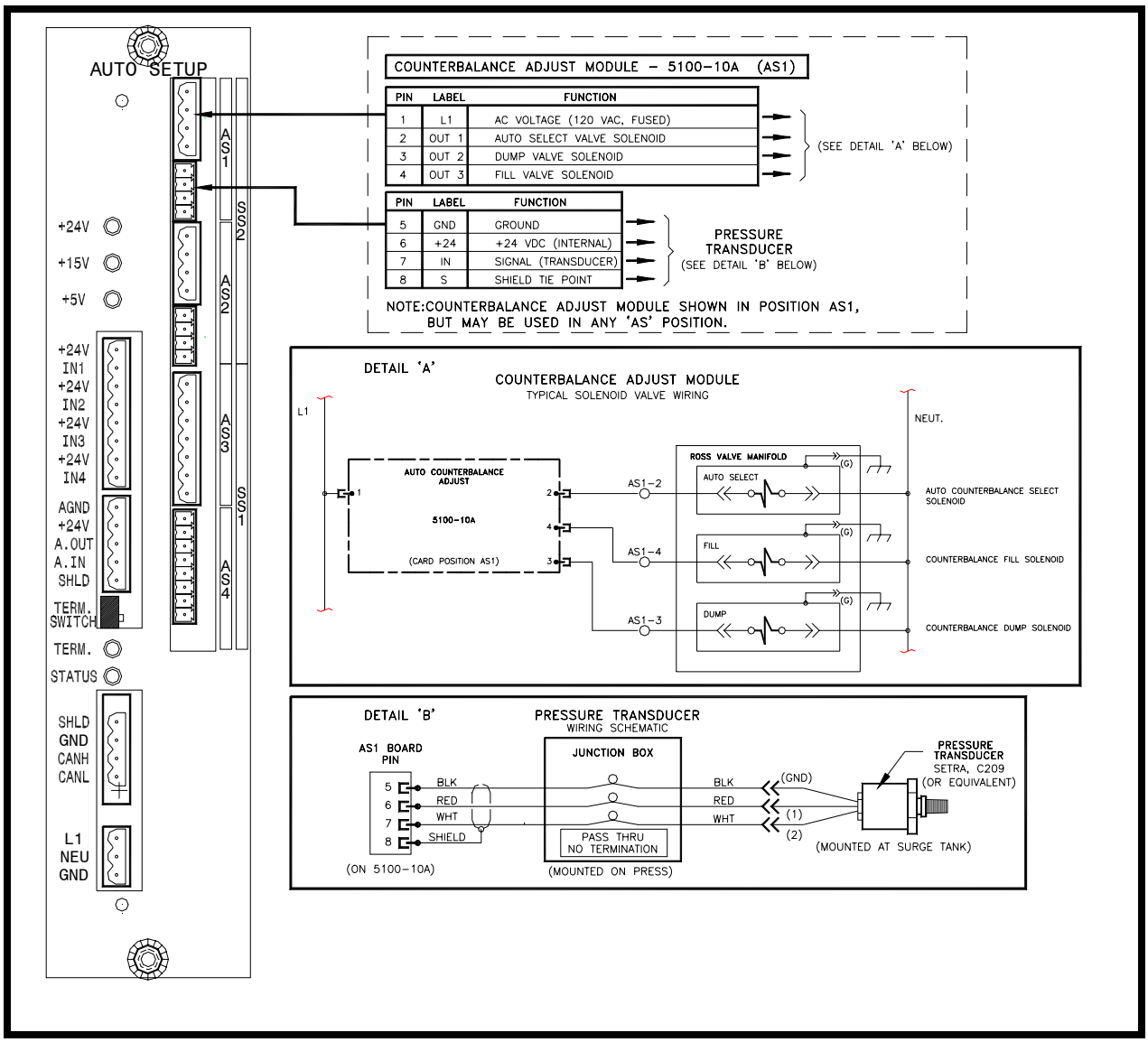

Figure B.1 Typical Counterbalance Wiring Diagram

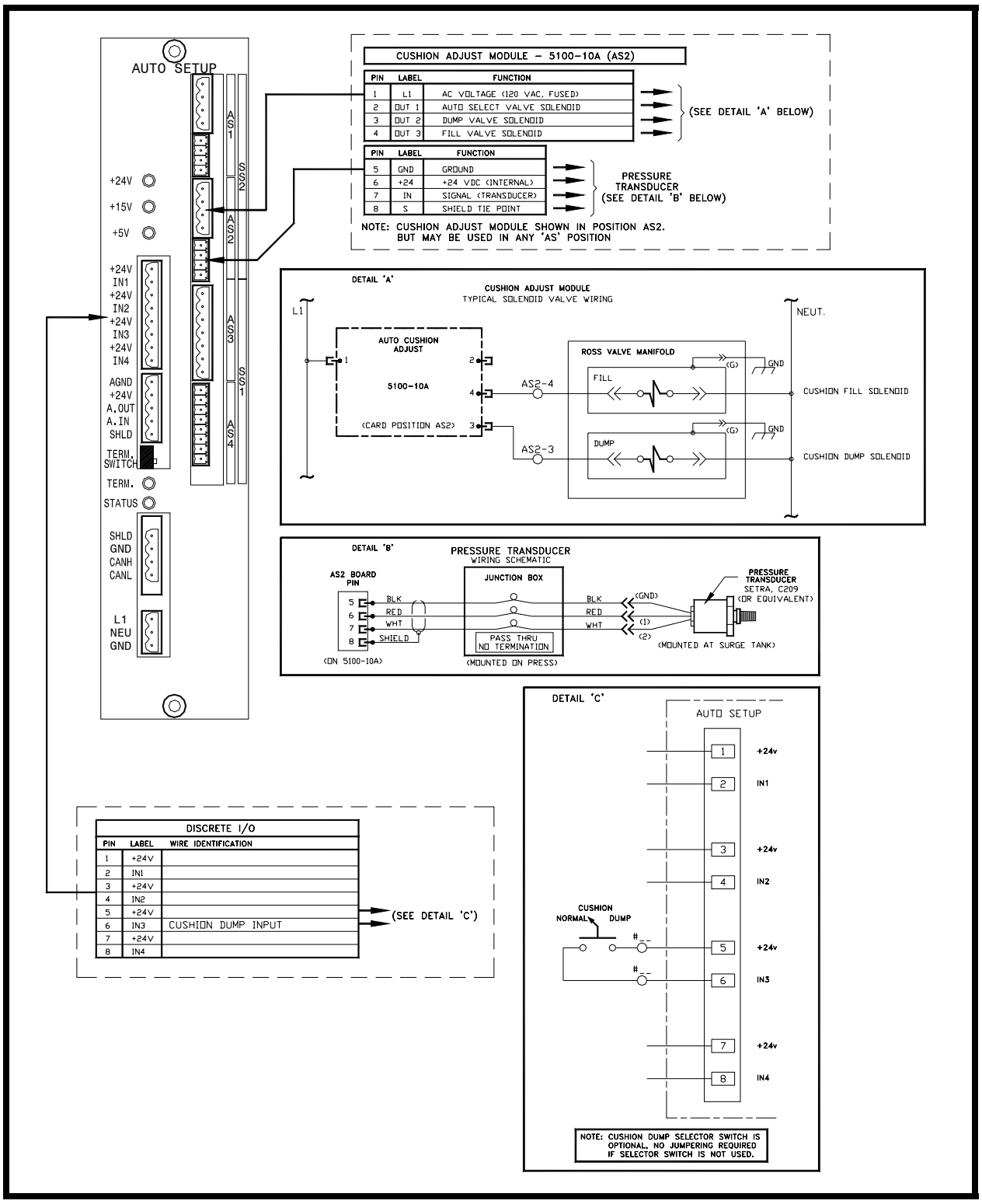

Figure B.2 Typical Cushion Wiring

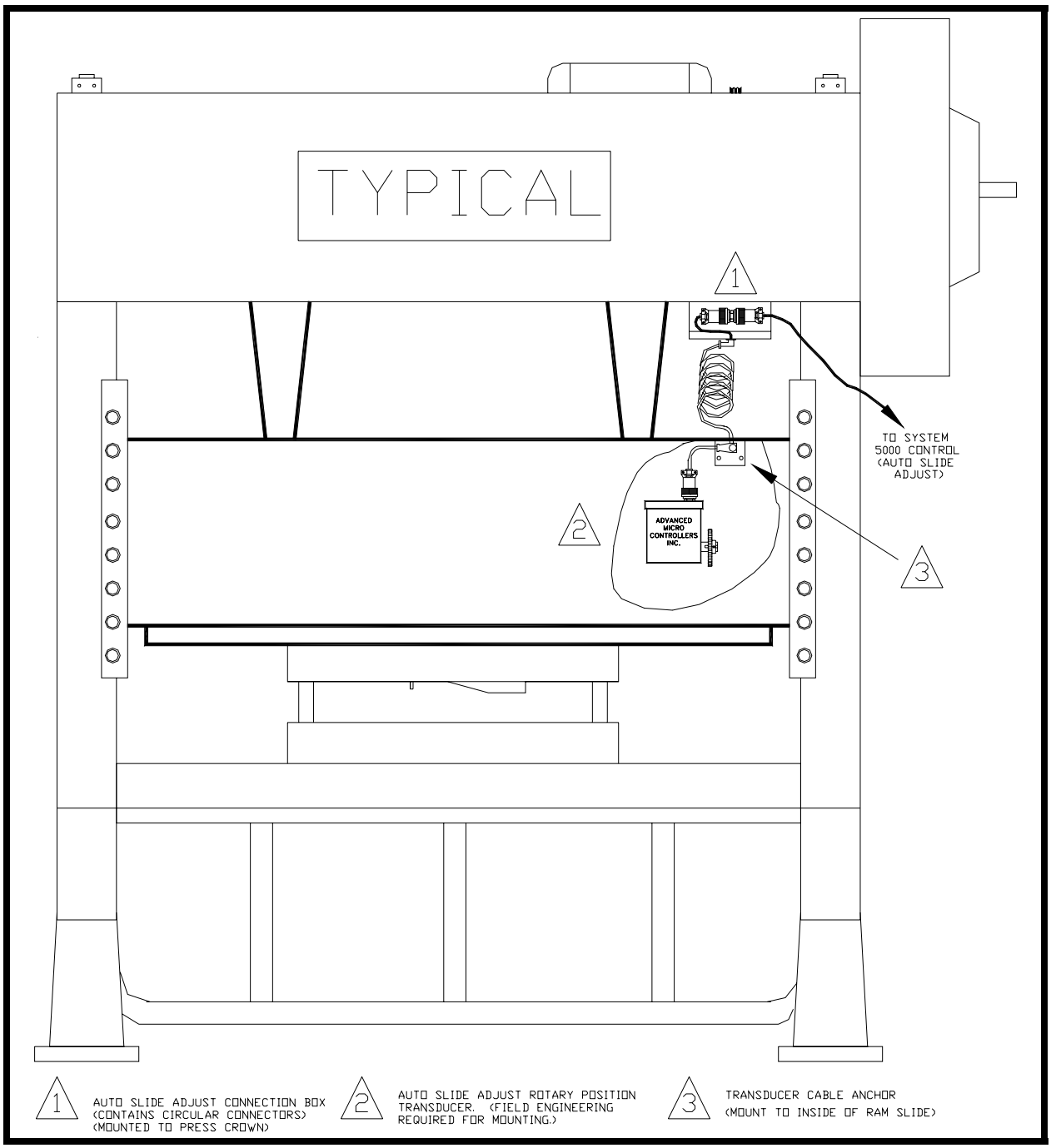

Figure B.3 Conceptual Dual Resolver Mounting

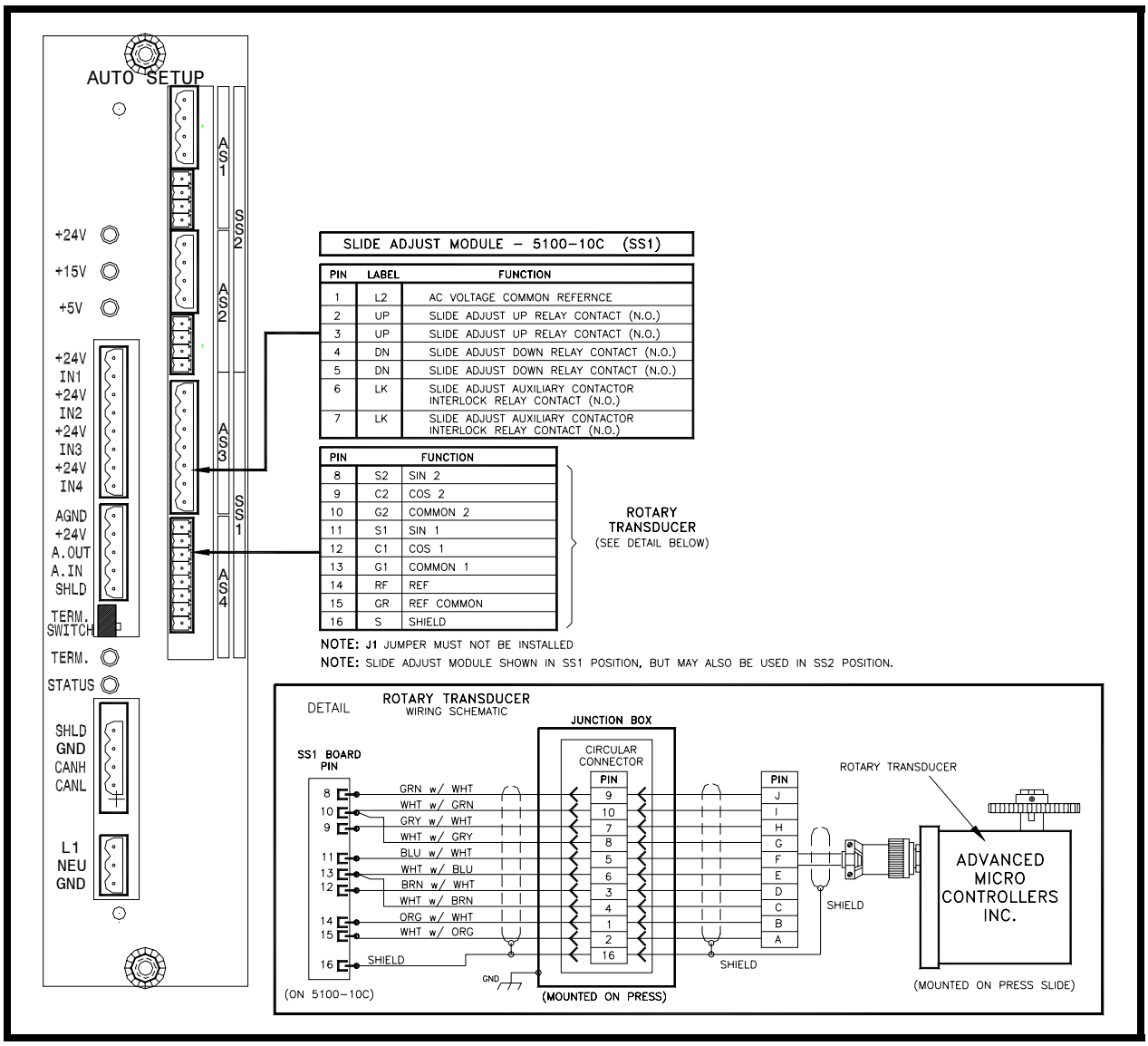

Figure B.4 Typical AMCI Dual Resolver Wiring Diagram

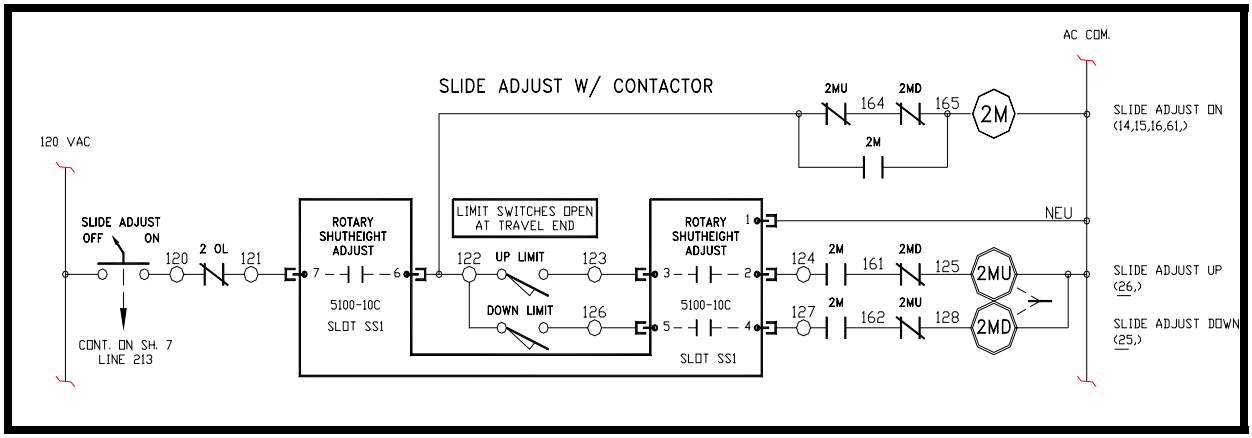

Figure B.5 Typical Slide Motor Starter Wiring With Auxiliary Contactor

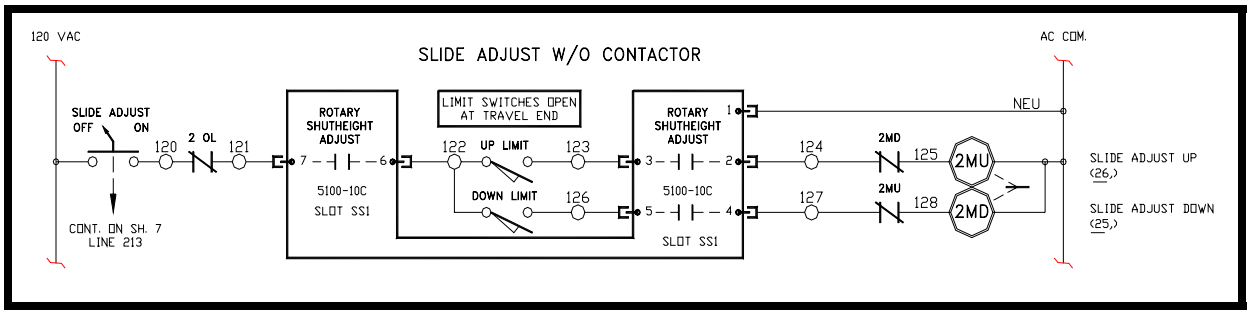

Figure B.6 Typical Slide Motor Starter Wiring Without Auxiliary Contactor

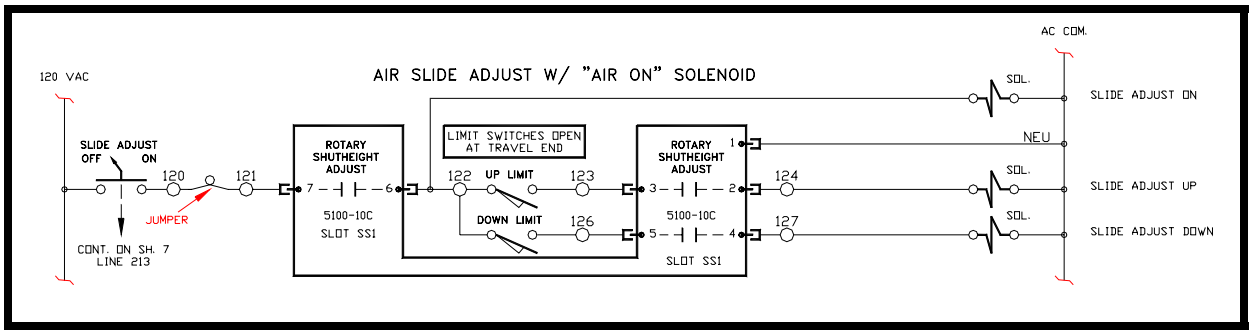

Figure B.7 Typical Slide Air Motor Solenoid Wiring

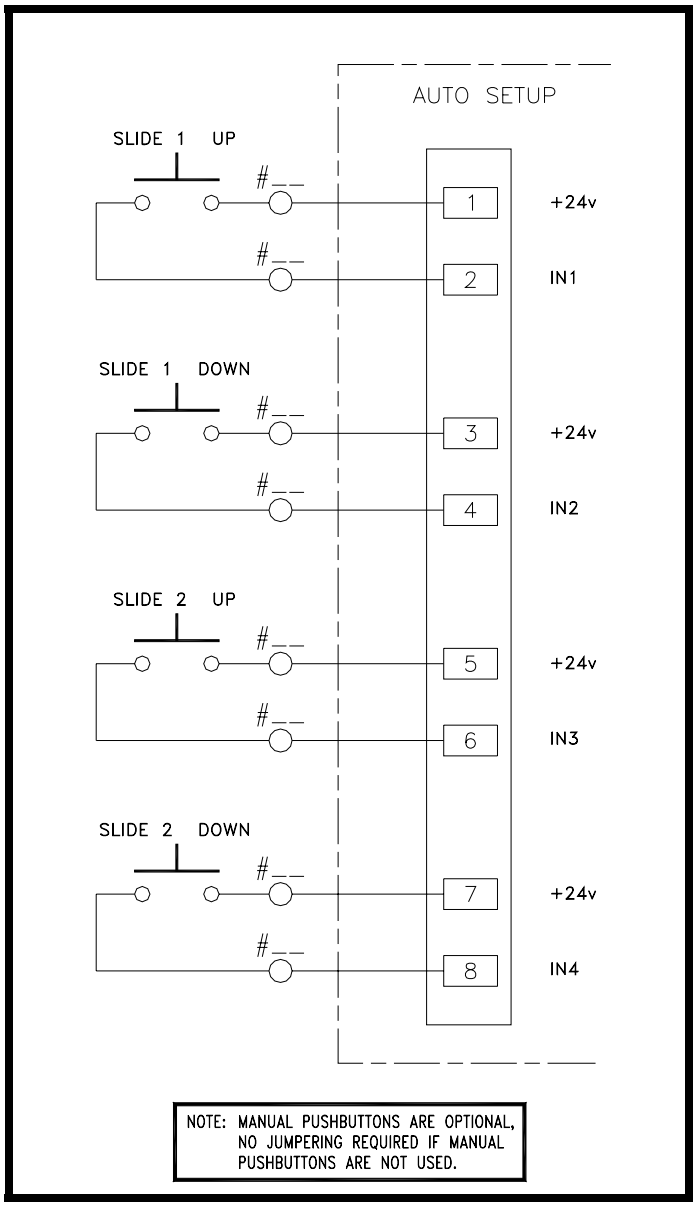

Figure B-8 Remote Jog Up and Jog Down Push Button Wiring

Appendix C Lockout Procedure For Air Controlled Systems

Section C.1 General Lockout Considerations

The OmniLink II Press Automation Automatic Setup module automatically controls pressures in cushions and counterbalances. Because of this there are special considerations to keep in mind when locking an air system out (at 0 pressure).

Note that cushions can be vented to zero pressure and the press will be allowed to run. A counterbalance that has been vented to zero pressure, however, is considered a stop condition by the press control.

While a type "A" valve has only integrated Fill/Dump valves, the type "B", and "C" integrated air valves (See Section 3.1 for a discussion of valve types) that Link uses to control air pressure on cushions and counterbalances has a manual as well as an automatic section. The manual section for these valves looks like a typical manual air pressure control with a regulator followed by a check valve. There is a pressure gauge ("G1") after the regulator but *before* the check valve, and a gauge ("G2") at the output air port *after* the check valve. When raising the pressure by turning the manual regulator "up" the pressure forces the check valve open and gauge "G1" will be approximately equal to gauge "G2". However when lowering the pressure at the manual regulator, the check valve will prevent the actual output pressure from going down (assuming there are no leaks). A LOX valve on the output is used to blow down the system to lower the pressure. In either case, gauge "G2" shows the true pressure in the counterbalance or cushion.

The automatic section of type "B" and "C" valves (and the only section of type "A" valves) consists of a fill valve and a dump valve. A transducer mounted on the counterbalance surge tank or cushion electronically reports the pressure of the system to the auto-setup board. If the pressure is too low the fill valve puts more air in the system. If the pressure is too high the dump valve vents air to atmosphere.

Section C.2 Valve Type "A" Lockout Procedure

To lock out type "A" valves:

1) Set the air pressure setpoint for the system to 0 psi. This will cause the control to open the dump valve and leave it open to vent the system. Note that this valve will be open only as long as the control is powered. If the system is set to 0 pressure, but the control is turned off before the system can blow down, it will still be pressurized.

2) Use a LOX valve, if present, to dump the air system.

Note!	**Step 1 *Must* be done even if a LOX valve is opened in step 2 since the control may try to pressurize to system using the Fill/Dump valve if the power is on!**

Section C.3 Valve Type "B" Lockout Procedure

The type "B" valve has a manual regulator in parallel with the automatic section that prevents the pressure it is controlling from going below a minimum. To lock this valve out:

1) Set the pressure setpoint for the air system to 0 psi. At this point the manual regulator will try to fill the system while the automatic section tries to dump.

2) Use the LOX valve (integrated into this type of valve) to dump the system and lock out the manual section.

Note!	**Step 1 *Must* be done even if a LOX valve is opened in step 2 since the control may try to pressurize to system using the Fill/Dump valve if the power is on!**

Section C.4 Valve Type "C" Lockout Procedure

When power is removed from the control or if the air system is turned OFF in the configuration menu, a type "C" valve will revert to the manual section and the pressure will be no lower than the regulator *but may be higher* because of the check valve.

To lock out a type "C" valve:

1) The air setpoint for the system to be locked out should be set to 0 psi OR the system must be turned OFF in the configuration menu.

2) Use the LOX valve (integrated into this type of valve) to dump the system ***even if the pressure setpoint is set to 0 psi at the control.*** This is necessary because if the control is powered down intentionally or unintentionally the valve will revert to the manual regulator setting and may attempt to fill the air system again.

Note!	**Step 1 *Must* be done even if a LOX valve is opened in step 2 since the control may try to pressurize to system using the Fill/Dump valve if the power is on!**

If the LOX valve is opened when the system is still turned on and the pressure setpoint is not 0 psi, the system will think it has a leak and will attempt to fill so it is important to turn the system OFF in the configuration menu or set the pressure setpoint to 0 psi *before* the LOX valve is opened.

Appendix D Specifications

Section D.1 5100-10A Pressure Control Board

AC Output Relays:	Voltage:	120VAC
	Current:	1 Amp Continuous
		20 Amp 16ms
		5 Amp 75ms
	Fuse:	2 Amp Fast-Blow Picofuse

Section D.2 5100-10C Rotary Shut Height Control Board

110 VAC Version

AC Output Relays:	Voltage:	120VAC
	Current:	1 Amp Continuous
		20 Amp 16ms
		5 Amp 75ms
	Fuse:	2 Amp Fast-Blow Picofuse

24 VDC Version

AC Output Relays:	Voltage:	24VDC
	Current:	2 Amp Continuous
		12 Amp 10ms
	Fuse:	2 Amp Fast-Blow Picofuse