Honeywell

User Manual

RamPAC®

Shut Height, Counterbalance and Cushion Control
A SmartPAC® module

1115200
Rev. C August 2001

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WINTRISS®

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Changes for Revision C of RamPAC User Manual

(1115200)

Revision C of the RamPAC User Manual covers firmware versions 1.33 and higher. The changes for this revision include:

- New pin numbers (Chapter 2 and wiring diagrams at end of manual)
- Addition of cable extension position transducer (Chapter 2 and wiring diagrams at end of manual)
- Addition of instructions for using RamPAC to monitor (but not control) shut height or to control counterbalance only. (Chapter 2 and wiring diagrams at end of manual)
- Addition of limitation on upper die weight based on manufacturer's recommendations and shop air pressure (Chapter 3)
- Addition of Ball Socket mode. (Chapter 3)
- Addition of Setup mode. (Chapters 3 and 4)
- Addition of limit on upper die weight to the lesser of: the maximum recommended by the press manufacturer *or* the maximum that the shop air pressure can counterbalance (Chapters 3 and 4)
- Addition of checking input check and zero cam circuits (Chapter 4)
- Addition of more troubleshooting information (Chapter 5)
- Addition of wiring for pressure transducer connector (Appendix B)

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Whatever the product, we are committed to satisfying you with innovative engineering, quality construction, reliable performance, and ongoing, helpful support. Call us whenever you need assistance.

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Important Highlighted Information

Important danger, warning, caution and notice information are highlighted throughout the manual as follows:

⚠ DANGER

A DANGER symbol indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

A WARNING symbol indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

A CAUTION symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

NOTICE

A NOTICE symbol indicates important information that must be remembered and aids in job performance.

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Honeywell's Wintriss Controls Group warrants that Honeywell Wintriss electronic controls are free from defects in material and workmanship under normal use and service for a period of one year (two years for Shadow light curtains) from date of shipment. All software products (PACNet and RSR), electro-mechanical assemblies, and sensors are warranted to be free from defects in material and workmanship under normal use and service for a period of 90 days from date of shipment. Honeywell's obligations under this warranty are limited to repairing or replacing, at its discretion and at its factory or facility, any products which shall, within the applicable period after shipment, be returned to Honeywell freight prepaid, and which are, after examination, disclosed to the satisfaction of Honeywell, to be defective. This warranty shall not apply to any equipment which has been subjected to improper installation, misuse, misapplication, negligence, accident, or unauthorized modification. The provisions of this warranty do not extend the original warranty of any product which has either been repaired or replaced by Honeywell. No other warranty is expressed or implied. Honeywell accepts no liability for damages, including any anticipated or lost profits, incidental damages, consequential damages, costs, time charges, or other losses incurred in connection with the purchase, installation, repair or operation of our products, or any part thereof.

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Chapter 1 – Introduction

The name "RamPAC"

This manual describes setting up and using SmartPAC with RamPAC. As a shortcut, only the name "RamPAC" may be used in some instances. Keep in mind that when you see "RamPAC," it really means "SmartPAC with RamPAC."

The RamPAC module for SmartPAC automatically controls shut height, counterbalance air pressure, and/or cushion air pressure for each tool you set up and enter into SmartPAC, based on your RamPAC configuration. This chapter describes RamPAC's capabilities and introduces you to the controls you use to operate SmartPAC with RamPAC.

How RamPAC Will Benefit Your Operation

RamPAC provides the following advantages to any press operation:

- **Increased productivity with automatic shut height adjustment.** After adjusting the shut height to the correct setting, a simple touch of a button saves that setting with all the tool information. From then on, the shut height is set automatically, without having to look it up. This will decrease setup time and increase production time. RamPAC will always approach the shut height setpoint from the top, ensuring accurate setup, time after time. If you attempt to run the tool and the ram is not at the setpoint, an error will be displayed on SmartPAC's screen.

- **Easy to use ram adjustment.** Once the RamPAC has been installed and set up, its operation is very simple. You select manual or automatic with a key switch (provided). In manual, use the ram adjust switch to move the ram up or down. In automatic, turn the up/down switch momentarily to the down position, and RamPAC automatically moves the ram to the shut height setpoint, even if the rams position is currently below the setpoint. In automatic, turning the up/down switch momentarily to up will cause RamPAC to adjust the shut height to the upper limit (set in initialization mode), allowing the maximum amount of access to the die area for trouble shooting.

- **Improved stopping performance.** The correct counterbalance setting can decrease the time required to stop your press, increasing the effectiveness of any die protection installed on your press. This will also increase the effectiveness of any point of operation guarding you have in place by decreasing the safety distance.

- **Automatic counterbalance pressure for each tool.** All you have to do is enter the press manufacturers suggested counterbalance air pressure for no die, and for one die weight (this information is usually found on the side of the press), then enter the upper die weight for each tool and RamPAC will automatically adjust the counter-balance air pressure as soon as you load the tool. RamPAC will also monitor and adjust the pressure during each stroke so that it doesn't drop by more than 1 PSI.

- **Economical use of electricity and compressed air.** With the counterbalance air pressure set properly for each tool, your press will run more economically, saving electricity to the motor, and air pressure to the counterbalance system.
- **Increased clutch and press life.** The correct counterbalance pressure will take up clearances in bearings before the die closes, lengthening the life of the bearings. With the ram properly balanced and the clearances taken up, you could be adding years to the life of your press.
- **Extended tooling life.** During each stroke of the press, RamPAC monitors and controls the cushion pressure at the correct level. This minimizes tool wear.
- **Easy, convenient installation of the valve assembly.** Fill, dump, check, lockout/dump valves, manual regulator and a filter are all combined in one easy-to-install package (counterbalance and cushion require separate valve packages). All it requires is air in from your shop air, and air out to the counterbalance or cushion tanks.
- **Manual lockout/dump valve.** Part of the valve package allows you to manually dump all air pressure from the counterbalance and cushion tanks. You are then able to attach a Lockout/Tagout tag to this valve and lock it open, allowing personnel to work on the press. This helps you to comply with OSHA 1910.147 Lockout/Tagout regulations.
- **Automatic control of cushion or other pressure.** Just enter the desired cushion air pressure for each tool in the programming menu, and it is saved with the tool information. Every time you load that tool, the cushion will be set to that pressure. You can use this feature to control a pressure other than cushion pressure, up to 150 PSI. This function is referred to in this manual as “cushion pressure” control.

The SmartPAC Front Panel

Here is a description of the keys and displays on the SmartPAC front panel. See Figure 1-1 for an illustration.

LED Display Three-digit display shows strokes per minute when the press is running; when the press stops, the display shows the crankshaft angle.

LCD display A large, bright 4.88" x 3.69" (10.91 x 9.37 cm) liquid crystal display used along with the keyboard to make and adjust settings, to load tool numbers, and to view diagnostic messages.

Screen contrast These keys adjust the readability of the LCD display; simply to make the necessary adjustments.

Program/Run key This keylock switch allows you to lock the Program mode so that settings cannot be changed. The key must be set at "Run" to operate the press. In Run mode some minor changes can be made, such as loading an existing tool number.

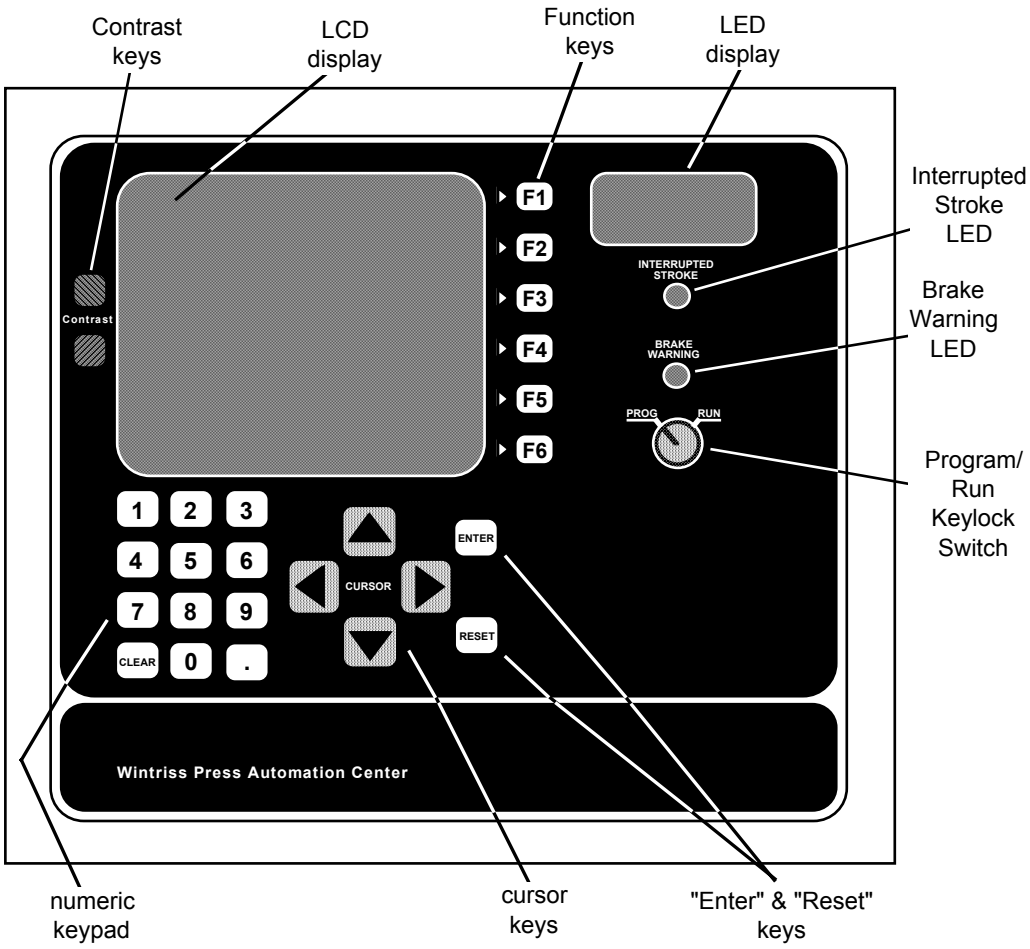


Figure 1-1. SmartPAC Front Panel

Keyboard	Use the keyboard (numeric keypad, plus cursor control, enter and reset keys) to enter settings. See “Using the keyboard” in Chapter 3, for detailed instructions.
Cursor keys	Use these up, down, left and right arrow keys to move the selection bar to the item you want to select on the display. Also use them to select alphabetic characters and special symbols when naming the press, tools, cam channels, and sensors.
Number keys	Use these keys on the numeric keypad to input numeric values, such as counter presets or tool numbers.
Function keys	Use these keys (F1 through F6) to perform certain tasks as instructed by the message on the SmartPAC’s display.
Enter key	Press ENTER to accept a selection you have made or to enter a number you have keyed in.
Reset key	Use this key to reset SmartPAC after fault messages appear on the display. Also used to let SmartPAC know you are "all done".

How Shut Height and Air Pressures Are Displayed

The SmartPAC LCD display shows current shut height of your press, as well as the upper and lower limits and the setpoints for different tools, in inches (10.258 inches) or millimeters (500.24 mm).

All air pressures, counterbalance and cushion, are displayed in pounds per square inch (52 PSI), kilopascals (10.346 kPa) or bars (45.214 bar).

Transducers

RamPAC utilizes two different types of transducers (sensors) to determine the shut height and air pressures. Chapter 2 gives detailed installation instructions.

Shut Height Transducer

RamPAC uses one of two types of shut height transducers, which are mounted on the ram:

A linear position transducer called the **Longfellow II**. A bracket is used to connect the shaft of the transducer to the part of the barrel that moves. The body of the sensor remains fixed in relation to the ram during slide adjustment. This type of transducer can be used only on wrist-pin presses.

A cable extension position transducer. A steel cable extends from a ram-mounted housing and attaches with a bracket to the part of the barrel that moves. This type of transducer is required on ball-socket presses and may be used on wrist-pin presses.

Air Pressure Transducers

RamPAC uses pressure transducers called **SA-200**s to measure the air pressure of both the counterbalance and cushion systems. Installation of the pressure transducer is described in Chapter 2 - Installation.

How to Use RamPAC

For each tool you set up and program, RamPAC stores the proper shut height, counterbalance air pressure, and/or cushion air pressure. (Complete instructions for how to use RamPAC are given in Chapters 3, 4, and 5.)

After initial setup of each tool, the shut height is stored as a set point. After that, RamPAC automatically sets the shut height to the same place every time you load the same tool.

If RamPAC Setpoints Are Not Met

For any or all functions, if the parameters being monitored are not at their setpoints, RamPAC will open its E-stop relay and display an error message on the SmartPAC screen. The relay will remain open until the problem has been corrected.

How RamPAC Calculates Counterbalance Pressure

When you first set up RamPAC, you enter the counterbalance air pressure required for two conditions: with no upper die and with the heaviest upper die. Then, when you set up for each individual tool, you enter its upper die weight. From the upper die weight, RamPAC calculates what the counterbalance air pressure should be, and automatically adjusts it as soon as you load the tool. As you run a job, RamPAC monitors the counterbalance air pressure and makes any adjustments needed to keep it at the correct level.

NOTICE

OSHA 1910.217 requires proper counterbalance settings. OSHA also requires that the upper die weight be stamped permanently on the upper die.

Example:

Figure 1-2 shows how RamPAC calculates the proper setting for a specific tool. In initialization, the user entered 45 PSI for no die weight, and 65 PSI for an upper die weight of 2000 lbs. The tool in question has an upper die weight of 1200 lbs. RamPAC determines that 57 PSI is the optimum counterbalance air pressure.

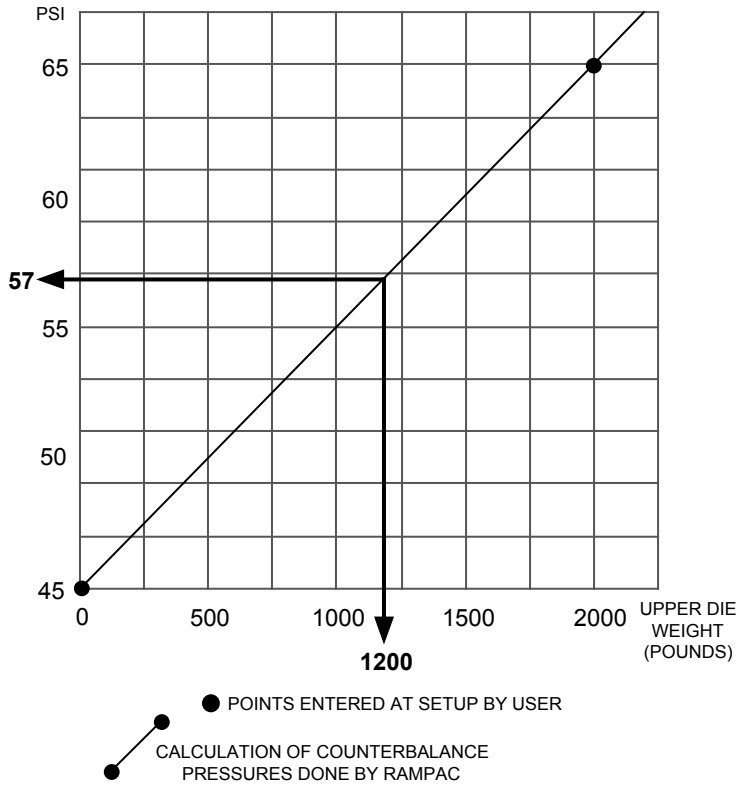


Figure 1-2. Counterbalance Air Pressure Calculation

How RamPAC's Counterbalance Control Works

The RamPAC counterbalance control adjusts the counterbalance pressure to its correct setpoint, then monitors it to make sure it does not go too low or too high. This is how it works:

1. **Operating Setpoint:** When you change or reload a tool number, or whenever the power is turned off and on, RamPAC fills or dumps the air to bring it within +/–1 PSI of the counterbalance setpoint based on upper die weight. This setpoint is the pressure at TDC necessary to counterbalance the ram so that it will not free fall if there is a catastrophic failure.

2. **Low Setpoint:** After five strokes, anytime the actual pressure drops one or more PSI below the setpoint, RamPAC fills air. If the counterbalance pressure falls five or more PSI below the setpoint any time the zero cam is closed, E-stop opens and an error message appears.

3. **High Setpoint:** When the counterbalance reaches its setpoint pressure, RamPAC then reads the pressure during the next six strokes. RamPAC automatically sets the high setpoint at five PSI above the maximum pressure it observes during the six strokes. Maximum pressure normally occurs at the bottom of the stroke.

   After RamPAC determines this high setpoint, at any time the zero cam is closed and the counterbalance pressure exceeds the high setpoint (usually due to a leaking fill valve), E-stop opens and an error message appears. After you reset the error, RamPAC goes back to 1, above.

Specifications

Equipment	**Enclosure:** 10.25” x 12” x 4” (26 x 30.5 x 10.2 cm), NEMA 12, shock mounted. Board available for installation in console. **Linear Position Shut Height Transducer:** 9”, 14”, 18”, 24”, 30” and 36” transducer for up to 8”, 13”, 17”, 23”, 29” and 35” shut height adjustment, respectively (for other lengths call the factory). **Cable Extension Position Shut Height Transducer:** For shut height adjustments up to 9”, 19” or 29” (for other adjustment ranges, call the factory) **Pressure Transducers for Counterbalance and Cushion Control:** 0-200 PSI; 1/4” NPT female. **Counterbalance and Cushion Control Valves:** 8.25” x 9.25” x 4.96” (ref.); 150 PSI max. 1/2” NPT female. **Operator Controls:** Ram Mode keylock switch, Ram Adjust switch, Ram Interrupt push button. All switches and buttons mount in 1.2” (30.5 mm) holes.
Electrical	**Input:** 115 /220 VAC , 50-60 Hz, 30 W. **Input check circuit:** 12-250 VAC or VDC.
Operating Temperature	32° to 122° F (0° to 50° C).
Inputs	Position transducer (for shut height measurement) 2 air pressure transducers (for counterbalance and cushion monitoring) E-stop input Operator control inputs.
Outputs	9 relays Rating 5A @ 120/240 VAC (N/O, held closed) One for stopping the press under fault conditions Remaining relays control RamPAC’s features.
Operator Interface	Through the SmartPAC Press Automation Control.
Setpoints	Shut height and cushion setpoints for each of up to 200 tools stored in SmartPAC Counterbalance setpoint calculated automatically from upper die weight (entered by user). Minimum counterbalance setting for manual mode

Chapter 2 – Installation

This chapter describes how to install RamPAC. The topics covered are:

NOTICE

Since RamPAC measures and displays shut height and counterbalance and cushion pressures, existing problems with these parts of the press will become more obvious after you install RamPAC.

For best performance, your press should be in good condition and properly maintained, especially with regard to the following:

- The ram should move smoothly up and down, not sticking at any point in its travel, with gibs well-maintained and lubricated.
- The main motor and the electric power source should be sufficient for the needs of the press.
- The counterbalance and cushion systems should not leak excessively.

NOTICE

RamPAC is available with or without an enclosure. The RamPAC board without the enclosure should be installed in a console or other suitable enclosure.

NOTICE

The second pressure control option is called “cushion control” in this chapter of the manual. However, you can use it to control some other pressure instead, up to 150 PSI.

Mounting RamPAC Control Enclosure

To mount the enclosure for RamPAC, follow these steps:

1. Determine a convenient place for the control enclosure. Remember that various sensors will be wired directly to the RamPAC board, and that the RamPAC board will be have communications cables that need to be run to the SmartPAC. Leave enough room to open the door at least 120°. The enclosure can be mounted to the press or on a free-standing pedestal.
2. Drill holes for mounting (see Figure 2-1). Shock mount studs are 1/4–20. Tap holes and mount the enclosure using the enclosed shock mounts. Use a No. 7 drill and 1/4–20 tap.

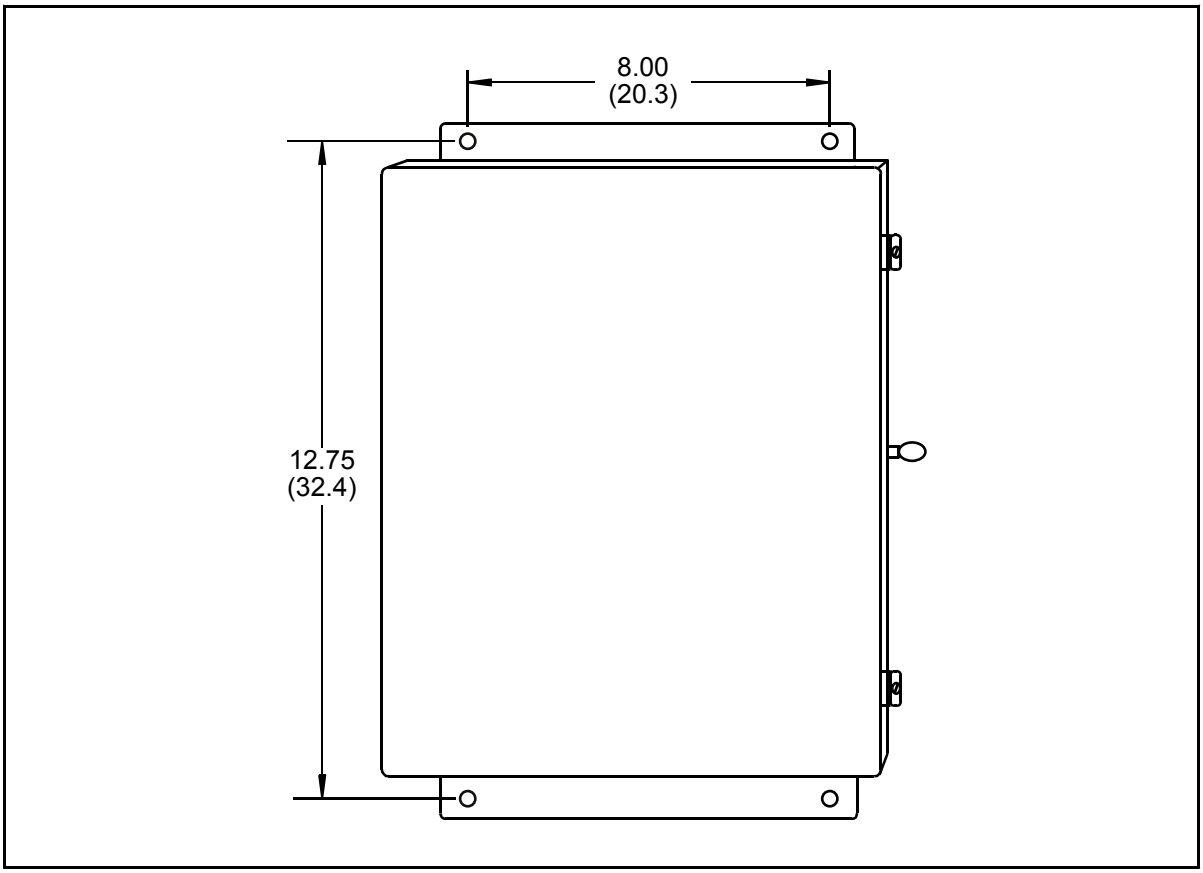


Figure 2-1. RamPAC Enclosure Mounting Dimensions

Installing RamPAC Without the Enclosure

If you ordered RamPAC without the enclosure, you received the RamPAC control board (refer to Figure 2-2).

Mounting Dimensions and Clearances for RamPAC Board

The board comes assembled with eight standoffs, one for each of the mounting holes on the board. Each standoff is size 6-32 and 1/2" in length. Recommended screw size is 6-32 x 3/8". See Figure 2-2 for mounting dimensions.

Mount the control board in a location convenient for installation and maintenance. Make sure there is enough room inside your enclosure to access the board if necessary.

CAUTION

COMPONENTS SHORT-CIRCUITING TO SURROUNDINGS

Allow at least 0.5" (13 mm) between the control board and any metal parts.

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

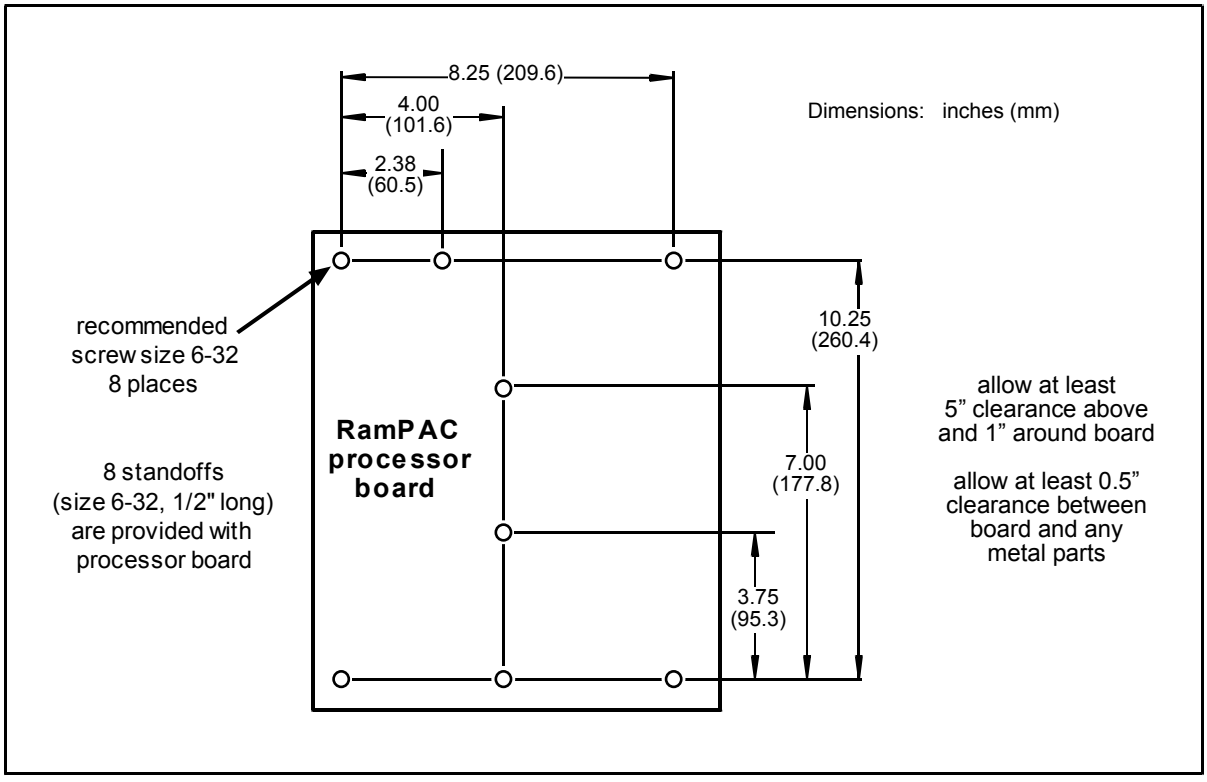


Figure 2-2. Mounting Dimensions and Clearances for Control Board

Next, design a mounting for and mount your position transducer. There are two types of position transducers normally used with RamPAC.

- If you have a Longfellow II linear position transducer, follow the instructions in the next section. This type of transducer can only be used with a wrist-pin press.
- If you have a cable extension position transducer, follow the instructions that start on page 20.

Mounting the Linear Position Transducer

If you are using RamPAC to control only the counterbalance and/or cushion air pressures, go to page 26 and continue from there. Otherwise, follow the instructions below to install the linear position transducer to measure shut height.

> **CAUTION**
>
> **DAMAGE TO LINEAR TRANSDUCER**
>
> Follow the installation instructions carefully to prevent permanent, irreparable damage to the transducer.
>
> **Failure to comply with these instructions could result in property damage.**

The linear position transducer is used to measure the shut height. The transducer has a threaded shaft that slides into the body of the transducer. The transducer provides an electrical output proportional to the distance the shaft is extended. It is essential to mount the transducer so it sees no side load. The transducer you received contains a swivel assembly that screws on to the end of the shaft. This assembly is used to compensate for vibration encountered by the transducer. It is NOT designed to allow any angular mounting of the transducer or its bracket. Following is a diagram identifying the parts of the linear transducer referred to in this manual, and a figure showing the transducer's dimensions.

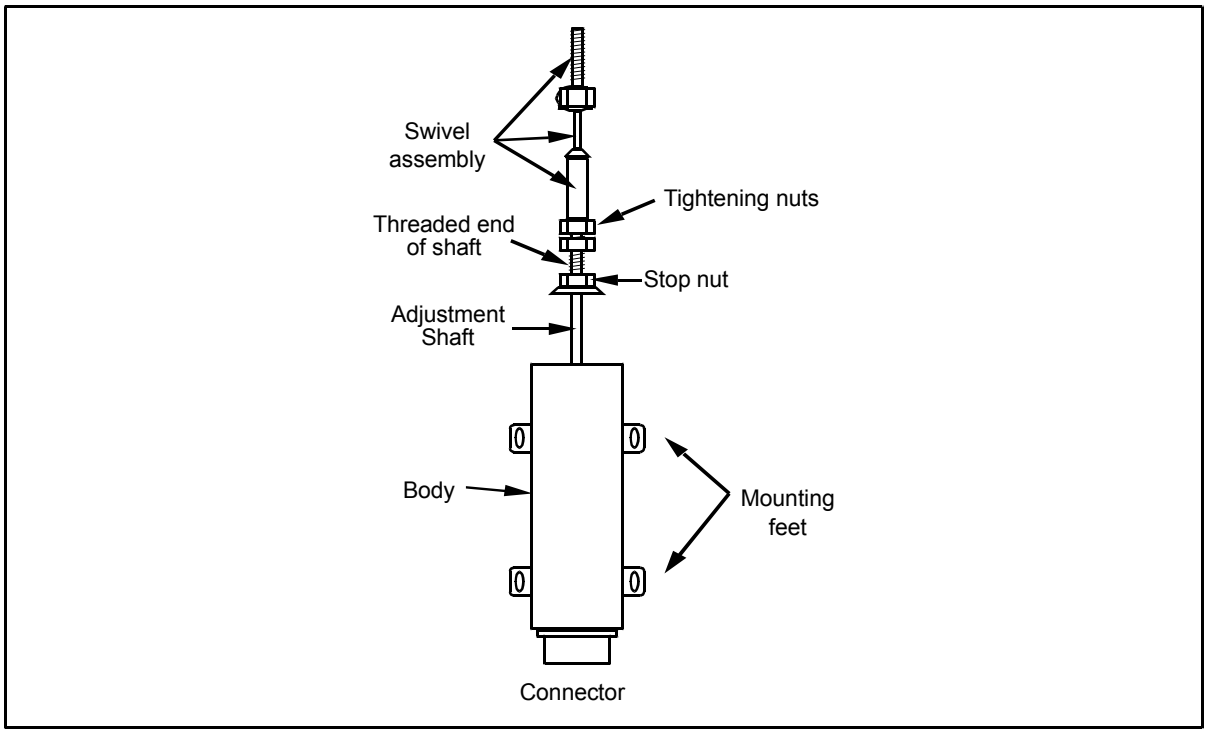
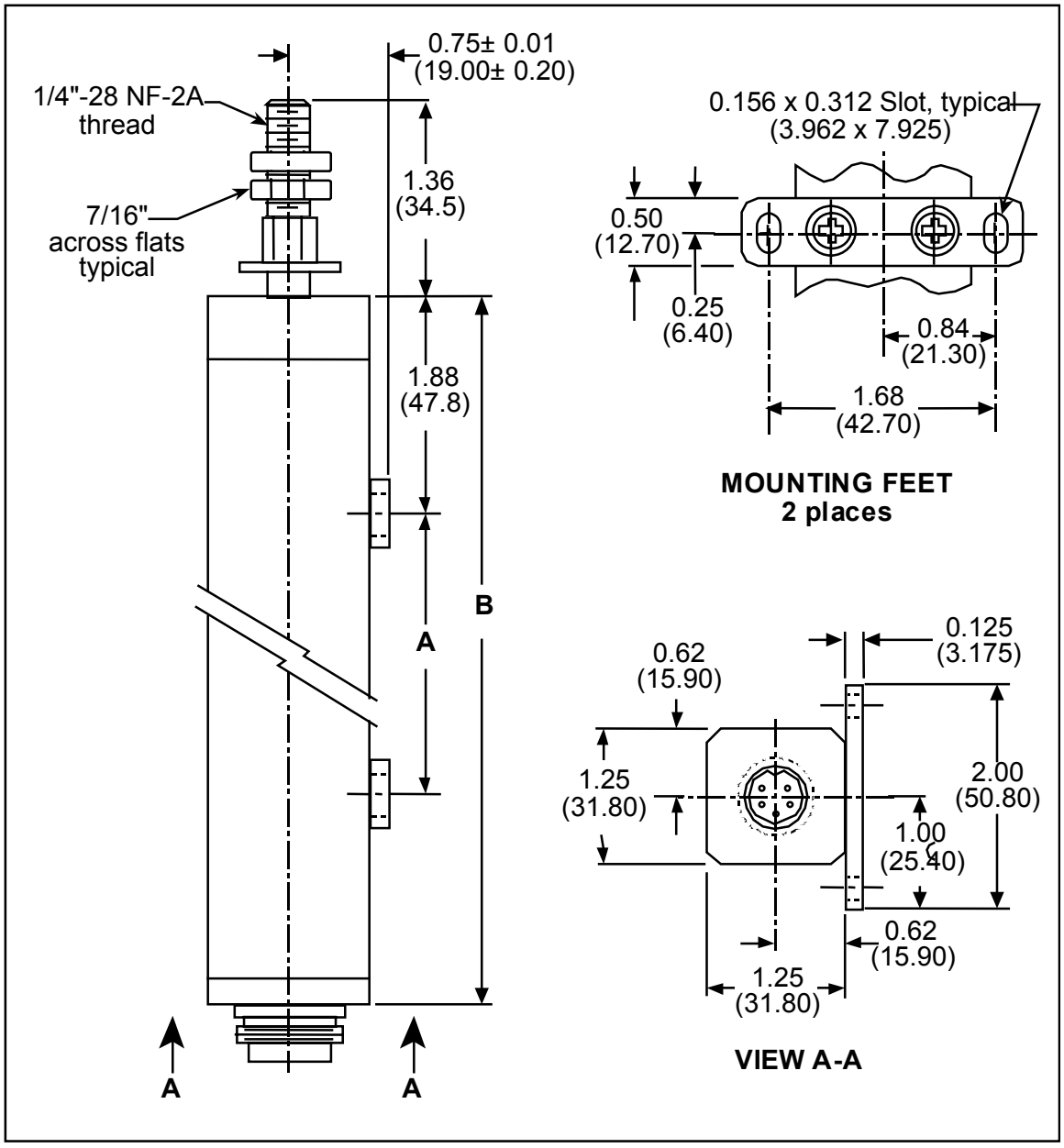


Figure 2-3. Linear Position Transducer



Transducer model	Wintriss Part Number	Travel	Adjustment range, max.	A	B
LF II 09/225	9633706	9 (225)	8 (203)	7.88 (200)	12.19 (310)
LF II 14/350	9633707	14 (350)	13 (330)	13.00 (330)	17.19 (437)
LF II 18/450	9633703	18 (450)	17 (432)	17.00 (432)	21.19 (538)
LF II 24/600	9633704	24 (600)	23 (584)	23.00 (584)	27.19 (690)
LF II 30/750	9633705	30 (750)	29 (737)	29.00 (737)	33.19 (843)
LF II 36/900	9633708	36 (900)	35 (889)	35.00 (889)	39.19 (995)

Figure 2-4. Linear Position Transducer Dimensions, inches (mm)

Keep in mind that installation of this transducer will vary from press to press (even "identical" presses). This section of Chapter 2 gives a general approach to installing the transducer that should work on most presses. However, some older presses will vary so much mechanically that the mounting will be vastly different. See Appendix A for examples of mounting this transducer on different presses. If you have difficulty finding a way to mount this transducer, call Wintriss Tech Support for assistance (find the telephone number on the front cover of this manual).

1. The first step in mounting the transducer is to find an appropriate location. Here are the things you should keep in mind when determining a location:

   - A bracket will be fabricated to connect the end of the shaft to the barrel. Locate the transducer so the bracket will be as simple as possible.
   - The transducer should not be subjected to any side load whatsoever.
   - The connector that attaches to the end of the transducer is a black square right angle connector with a black rubberized cable coming out of it; leave enough space to have a service loop in the cable.
   - The entire transducer assembly (transducer body, shaft or cable, and fabricated bracket) should move together with the ram when the press is running.
   - The shaft and fabricated bracket should move independently of the body when the shut height is being changed.
   - The transducer shaft should never be fully extended or fully retracted into the body.
   - When the shut height is adjusted to any point, neither the transducer nor the bracket should hit anything on the press when it is cycling.
   - When mounted, the transducer should be easily accessible.
   - Plan the mounting for the transducer and its bracket to minimize modifications to the press. (For example, if a splash guard is in the way, mount the transducer and bracket so that only part of the guard needs to be removed, rather than the whole guard.)
   - The transducer should be protected from oil and other contaminants as well as possible. Obviously, in a press room it would be impossible to completely protect the transducer from oil. However, it should be mounted to minimize the amount it is subjected to. (For instance, do not mount the transducer in an area that would cause any or all of it to be submersed in oil at any time.)
   - The transducer should be protected from mechanical damage.

   Keeping these points in mind, find the best place on your press to mount the transducer. Figure 2-4, is an example of how the transducer was mounted on a 300 ton Minster E2. See Appendix A for other examples.

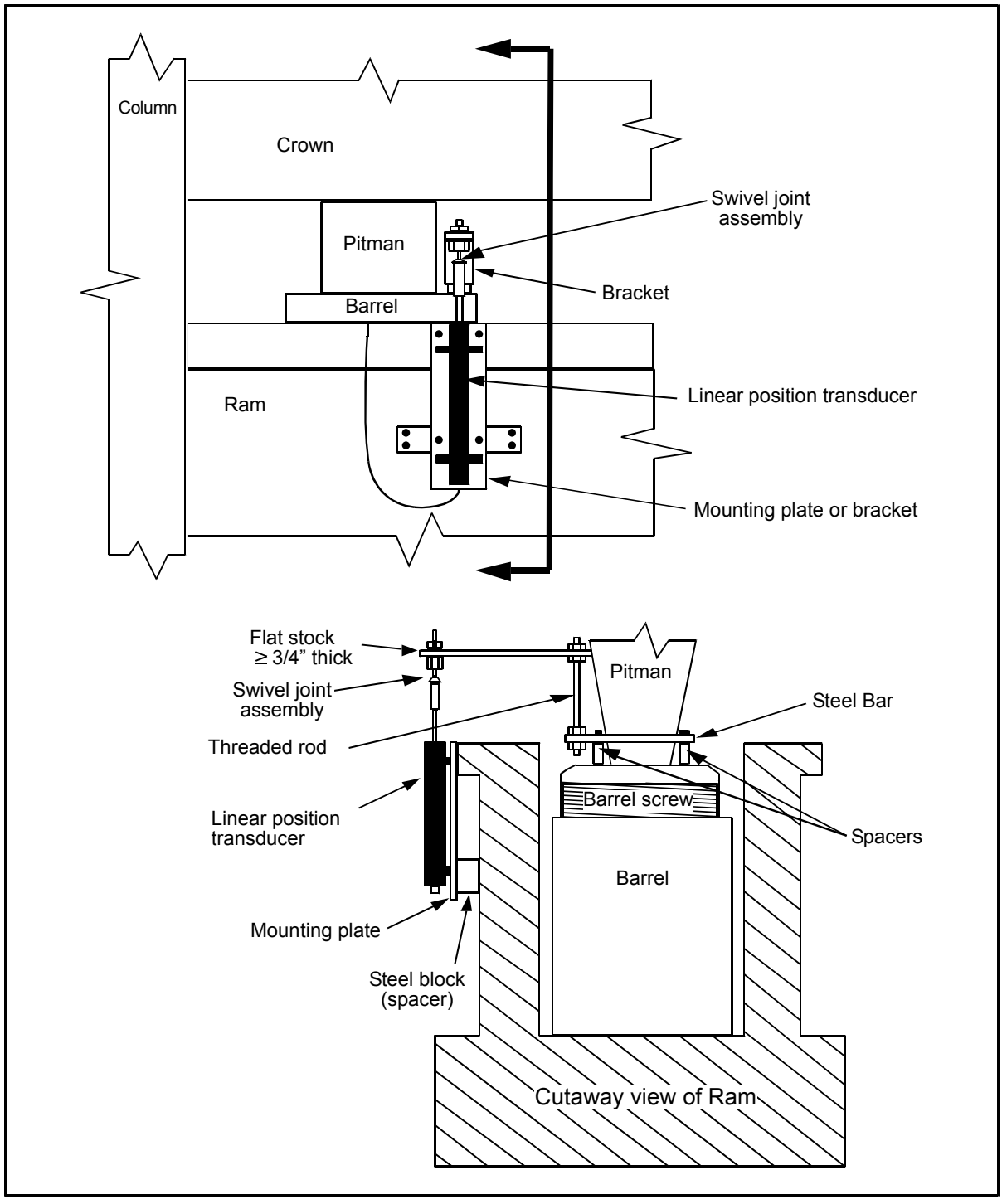


Figure 2-5. Linear Position Transducer Mounting

2. After determining where you will mount the transducer, a bracket must be fabricated. This can be done in a couple of ways. The first is to construct bracketing from different components attached together, as shown in the figure above. The second is to fabricate a one-piece bracket. This option would take more time, but may hold up better in the long run. If you choose to machine a one-piece bracket, be sure to choose stock that is rigid and strong. The thickness of the bracket should be at least 3/4". Figure 2-6 is an example of how the previously described and illustrated bracket would look if it were one piece.

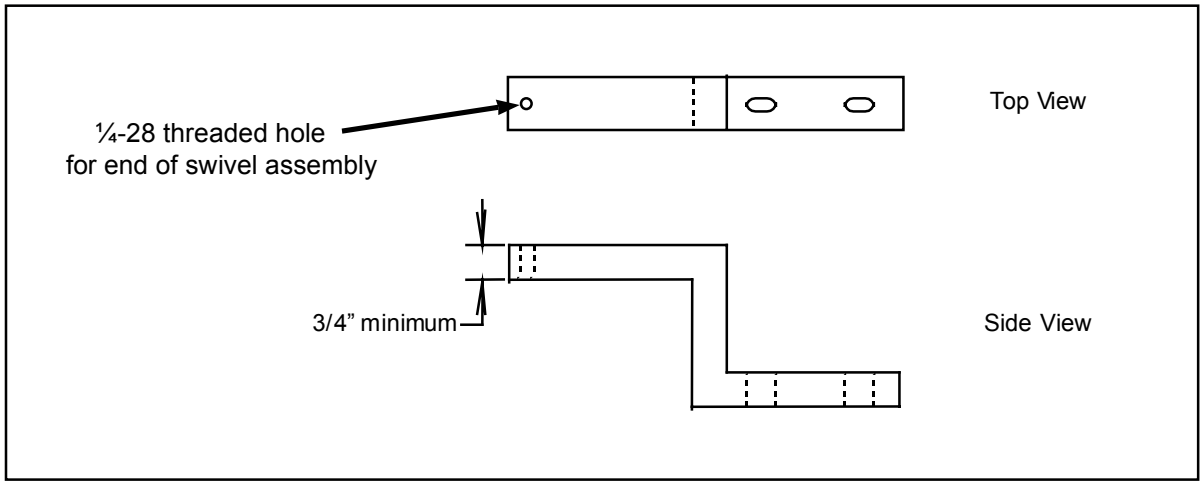


Figure 2-6. One-piece Bracket

In either instance, it may be helpful to machine slots into the part of the bracket that will mount onto the barrel to make it easier to align with the transducer. Take care to fully inspect the press before fabricating this bracket. Measure the area it will occupy at both top and bottom dead center, as well as with the shut height adjusted all the way up and all the way down. On some presses, the barrel will go into a sleeve as the shut height is opened up, as shown in the next figure. If this is the case, be sure the bracket fits into the sleeve.

The hole in the end of the bracket that will be attached to the transducer should be tapped with 1/4-28 threads to accommodate the end of the swivel assembly. It could, however, be drilled so the threads of the swivel assembly just pass through and use two 1/4-28 nuts, one on each side of the bracket, to tighten it down.

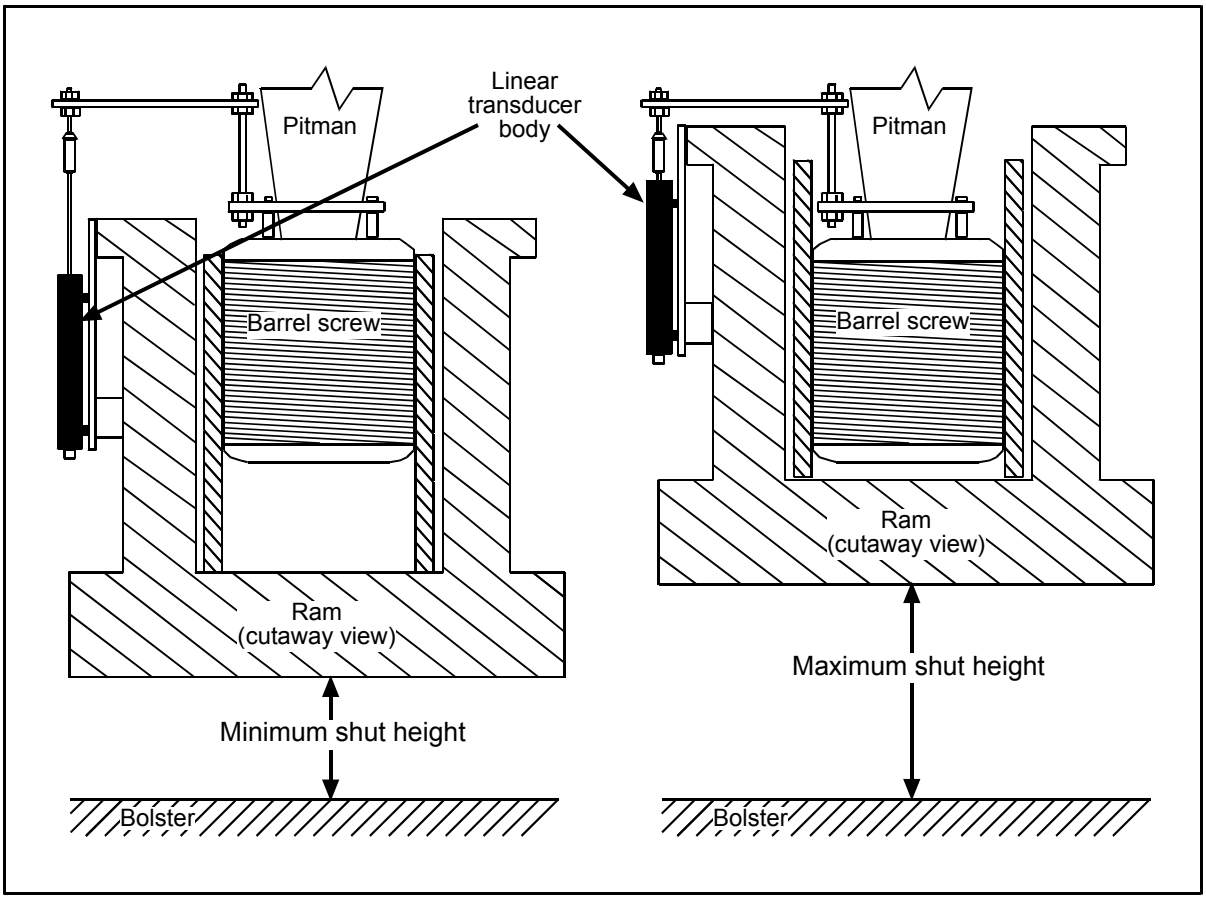


Figure 2-7. Cutaway View, Minimum and Maximum Shut Height

3. Next connect the bracket to the connection point on the barrel. Leave the mounting screws loose so the bracket moves back and forth freely but does not lift up from the barrel.

4. The next step is to make a bracket or mounting plate for the transducer (see figures 2-6 and 2-7). The transducer may be mounted inside a piece of heavy aluminum U-channel to protect it from physical damage. Make sure the plate or bracket is long enough to accommodate the transducer and its connector, and wide enough for the mounting feet of the transducer (see figure, page 14).

   Be sure the label on the transducer is facing outward, in case you need to find the part number for any reason. Do not mark or drill mounting holes for the transducer yet. That will be done later.

CAUTION

DAMAGE TO TRANSDUCER

Install the transducer straight. Use a level to check that it is mounted correctly.

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

5. Once you have the bracket or plate, you need to mount it on the press directly under the bracket extending from the barrel (installed in step 3, above). Usually this means the connecting the mounting plate or channel to the lip of the ram. On smaller presses, the lip will only accommodate 2 screws. In this case, fasten a block between the bottom of the plate and the ram face to make the plate vertical. Use a level to check this.
6. Adjust the shut height to its highest position with the ram at top dead center. With the swivel assembly attached to the end of the shaft, connect it to the bracket that extends out from the barrel. Be careful not to let go of the body of the transducer. The transducer you have should have at least 1" more travel (the distance the shaft of the transducer extends from its body) than is necessary for your press.

   For instance, if your press has a shut height adjustment of 8", you should have a 9" transducer (physical length of the body will be slightly longer than 9"). If your adjustment range and transducer are the same length, call Wintriss Tech Support or your sales representative to get the correct size transducer.

> **CAUTION**
>
> **DAMAGE TO TRANSDUCER WHEN HYDRAULIC OVERLOAD COLLAPSES**
>
> Allow for additional travel if your press has a hydraulic overload mechanism integral to the connection at the ram. Find the distance that the overload mechanism collapses when overloaded, as specified by the press's manufacturer. Add this distance to the shut height adjustment when you calculate the travel needed for your shut-height transducer. When you install the transducer body, install it this distance higher than the location indicated by the instructions below. This will allow sufficient travel to prevent damage to the transducer if there is an overload condition.
>
> **Failure to comply with these instructions could result in property damage.**

   Once the transducer is attached to the bracket, extend the body away from the bracket until the shaft is exposed 1/2 of the extra travel of your transducer (in this case 1/2").

   The body of the transducer should be right against the plate you will be mounting it to. Hold the transducer body against the plate and **use a level to ensure that there is no angle toward or away from the press**. If the transducer is plumb at this point, mark the plate at the position of the holes in the mounting feet.
7. Adjust the shut height to its lowest position. Reattach the transducer to the bracket and place it against the plate, lining up the holes in the transducer's mounting feet with the marks you made in the previous step. Ensure that the shaft is exposed the entire length of the adjustment range plus 1/2 of the extra travel of the shaft (in this case 8" adjustment + 1/2" = 8 1/2"). **Check that the transducer is still plumb.**
8. If everything in step 7 was okay, disconnect the transducer and remove its mounting plate from the ram. Drill and tap 4 holes in the plate where you marked it. 8-32 is a good size screw to use for mounting the transducer.
9. Connect the transducer to the bracket extending out from the barrel, then attach the transducer to the plate, using Loctite-blue no. 242, or equivalent, on the screws.
10. Once the transducer is mounted and plumb, tighten the screws holding the bracket to the barrel.

Installing the Cable Extension Position Transducer

> **⚠ WARNING**
>
> **ELECTRIC SHOCK AND MECHANICAL HAZARDS**
>
> - Disconnect main power at SmartPAC before installation.
> - Turn off all power to the press, press control, and other equipment used with the press during installation.
> - "Tag out" per OSHA 1910.147 Control of Hazardous Energy (Lockout/Tagout).
>
> **Failure to comply with these instructions could result in death or serious injury.**

> **⚠ WARNING**
>
> **INCORRECT INSTALLATION**
>
> Ensure that installation is performed by qualified personnel only.
>
> **Failure to comply with these instructions could result in death or serious injury.**

> **CAUTION**
>
> **DIE DAMAGE IN BALL SOCKET PRESS**
>
> Enable Ball Socket mode in Initialization if RamPAC is installed on a ball socket press. [INITIALIZATION – RAMPAC INIT – SHUT HEIGHT SETUP] On a ball-socket press, RamPAC will have accurate shut height information only at top dead center (TDC) or bottom dead center (BDC). If you have a ball socket press and disable Ball Socket mode, the automatic shut height adjustment will not work properly and die damage may occur.
>
> **Failure to comply with these instructions could result in property damage.**

> **CAUTION**
>
> **TRANSDUCER DAMAGE**
>
> Install the Cable Extension Position Transducer with care. Follow these instructions exactly to prevent permanent, irreparable damage to the transducer.
>
> **Failure to comply with these instructions could result in property damage.**

The cable extension position transducer is used to measure the shut height. The transducer has a stainless steel measuring cable that extends from and retracts into the transducer body. The transducer provides an electrical output proportional to the distance the measuring cable is extended. The following figure shows the transducer dimensions.

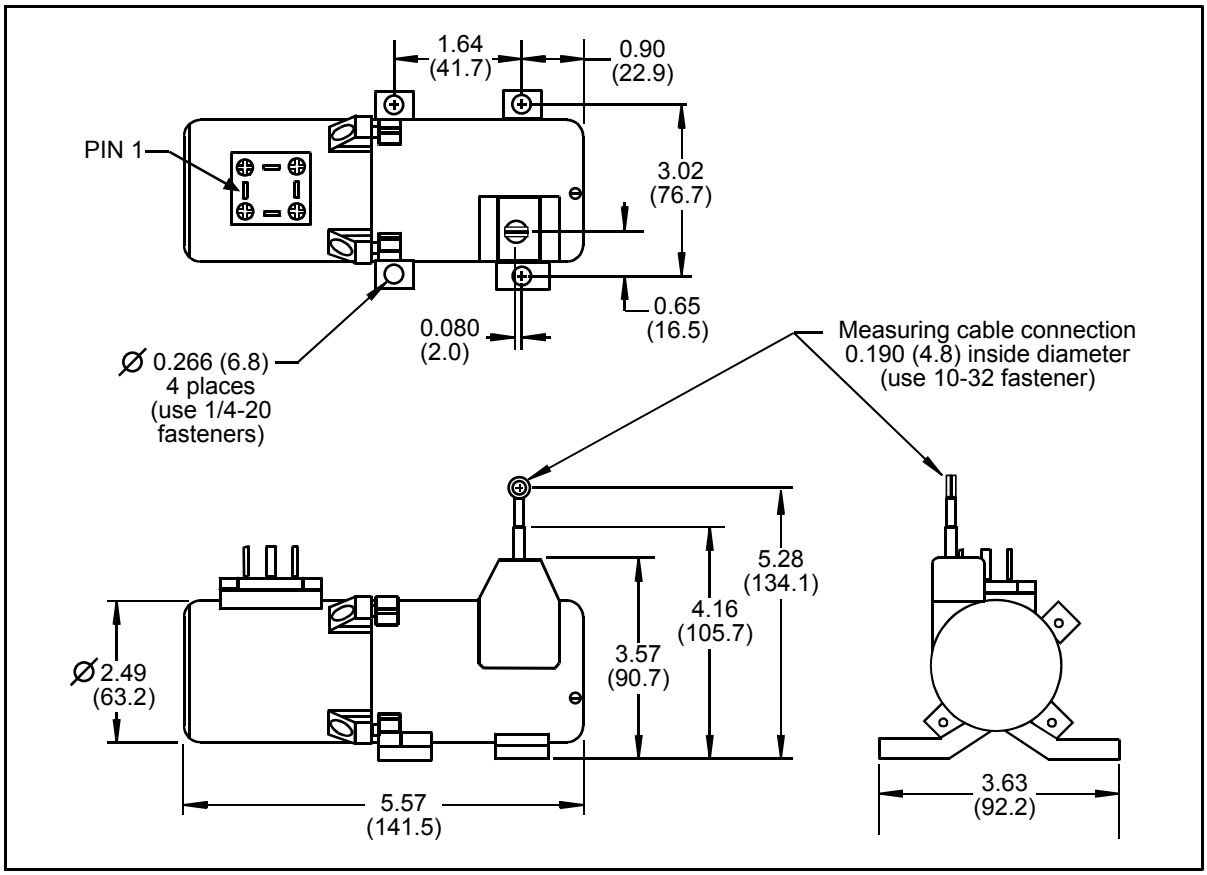


Figure 2-8. Transducer Dimensions in inches

The installation of this transducer will be different on different presses. These instructions give a general approach to installing the transducer that should work on most presses. If you have difficulty finding a way to mount this transducer call Wintriss Tech Support for assistance.

First of all, determine where to mount the transducer and what to fasten the measuring cable to. Keep the following factors in mind when selecting a location for the transducer and a method of securing the cable to the pitman:

- The measuring cable should extend vertically from the transducer body.
- The measuring cable should NEVER be fully extended from or fully retracted into the transducer body. The transducer should retain at least ½" of cable inside at the highest or lowest shut height.
- In most cases, you will need to fabricate brackets and/or mounting plates for the transducer body and the measurement cable connection.
- The entire transducer installation (body, cable, and brackets) should move together on the ram while the press is running.

- The stainless steel measurement cable and bracket should move independently of the transducer body when the shut height is being changed.
- Throughout the range of shut height adjustment be sure that transducer assembly, cables or mounting gear do not touch any part of the press while it is running.
- Use a long enough signal cable so that it is never stretched taut when the ram is at its lower limit, and there is enough length to allow for a service loop. The transducer signal cable is black and rubberized with a black, square, right-angle connector on one end.
- When mounted, the transducer should be easily accessible.

Mounting the Transducer Body

Keeping the above points in mind, find the best place on the ram to mount the transducer body. You may have to provide a base plate or bracket for mounting it. Figure 2-8 shows the dimensions of the mounting holes in the feet of the transducer body. Figure 2-9 shows an example of how the transducer is mounted on a **Bliss HP2-150 Ton** ball and socket press.

Mount the transducer body using ¼-20 bolts.

Connecting the Measuring Cable

In some cases, you can fasten the measuring cable directly to the pitman. On the Aida NC1, for example, you can simply drill and tap a hole in the pitman and use a 10-32 bolt to secure the end of the measuring cable. In most cases, however, you will need to design a bracket that extends the measuring cable vertically from the transducer body. Fabricate the bracket, install it on the pitman, and then connect the measuring cable to it using 10-32 fasteners and a lock washer.

On a ball and socket press, the measuring cable will experience some side-to-side movement as the press cycles. When the press is at TDC or BDC the measuring cable should be plumb (vertical). In the case of a wrist-pin type press, there should be no side to side movement in the measuring cable; it should be vertical all the time.

In the example in Figure 2-9, a piece of ½" stock was used as a bracket plate and a bracket of ½" x 1" steel was welded to it. The bracket was designed so the measuring cable was plumb (vertical) at the top and bottom (TDC and BDC) of the stroke.

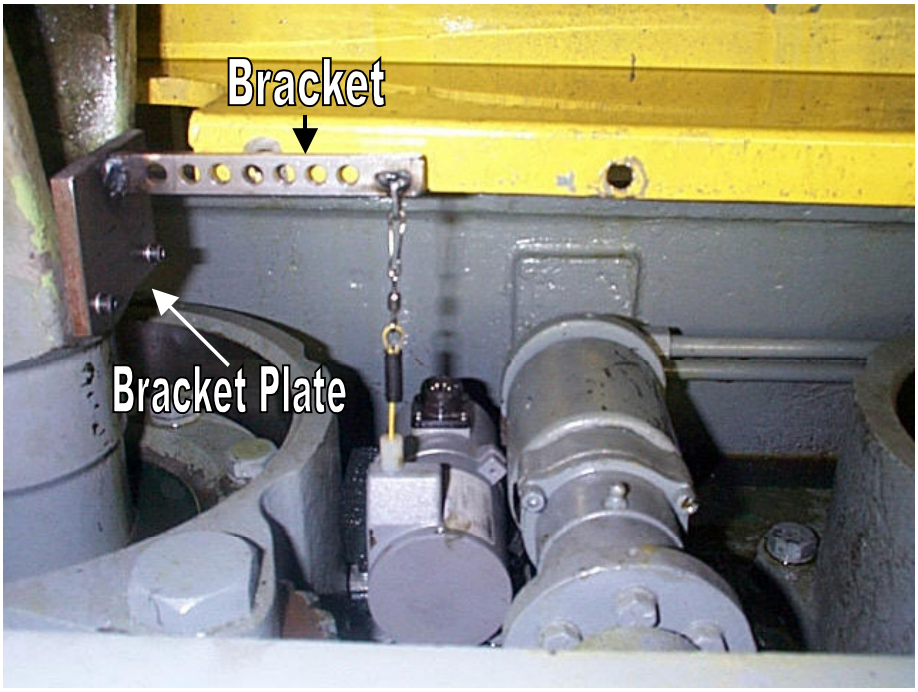


Figure 2-9. Transducer Mounting

NOTICE

The illustration above shows a transducer similar to the one you are installing. However, your transducer has a different electrical connector and it has an eyelet attachment point on the measuring cable instead of the clip shown in the picture.

1. Inch the press down to 180 degrees (BDC) and move the ram to its lowest limit.
2. Once everything is mounted, check to make sure at least ½" of the measuring cable is left in the body of the transducer at the upper and lower shut height limits.
3. Mount the Transducer Junction Box on the crown of the press right above the transducer in an easily accessible place. See the figure below for mounting dimensions.

To wire the transducer, see page 39

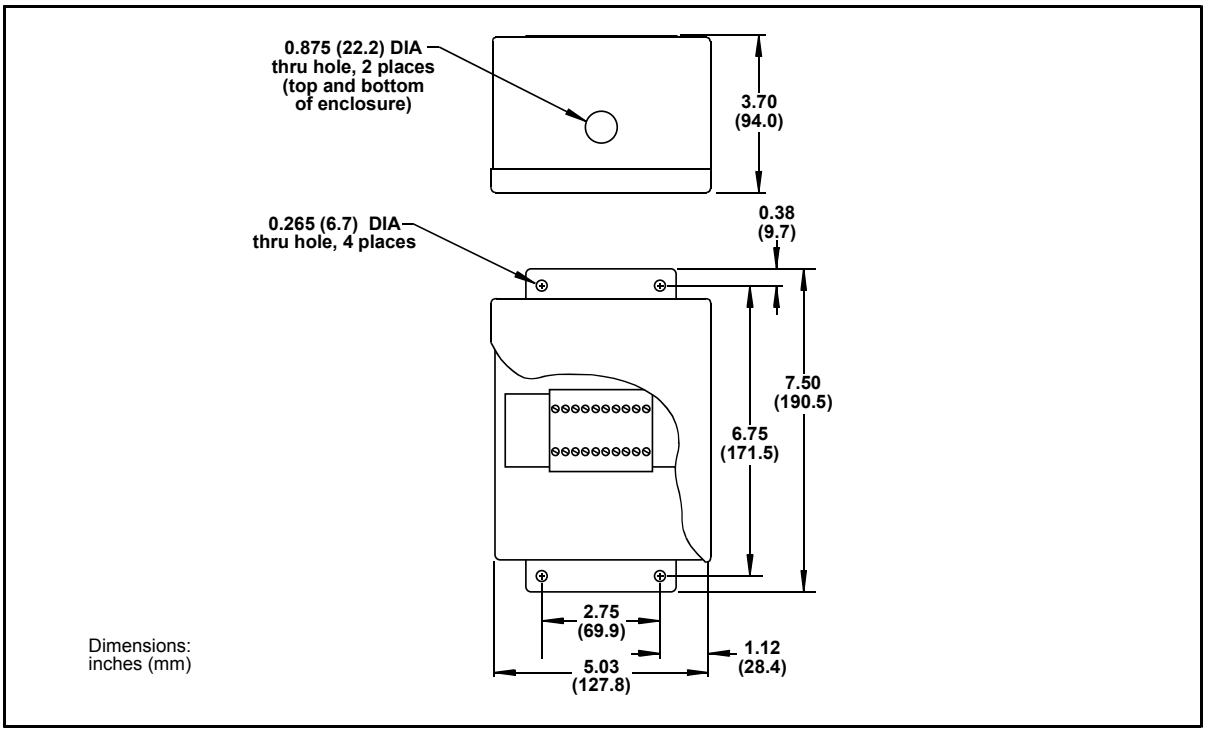


Figure 2-10. Transducer Junction Box Mounting Dimensions

CAUTION

DIE DAMAGE IN BALL SOCKET PRESS

Enable Ball Socket mode in Initialization if RamPAC is installed on a ball socket press. [INITIALIZATION – RAMPAC INIT – SHUT HEIGHT SETUP]

On a ball-socket press, the shut height measured by RamPAC is accurate only at top dead center (TDC) and bottom dead center (BDC). If you have a ball socket press and disable Ball Socket mode, the automatic shut height adjustment will not work properly and die damage may occur.

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

If this press is a ball socket press, verify that Ball Socket mode is enabled in Initialization mode [INITIALIZATION – RAMPAC INIT – SHUT HEIGHT SETUP] (see page 68). This will allow ram adjustments only when the press's crankshaft is within 10 degrees of either TDC or BDC. If the ram is at any other position, the transducer cannot give accurate readings. Enabling Ball Socket mode allows ram adjustment only when the press is within +/- 10^{o} of TDC or BDC as shown in the figure below.

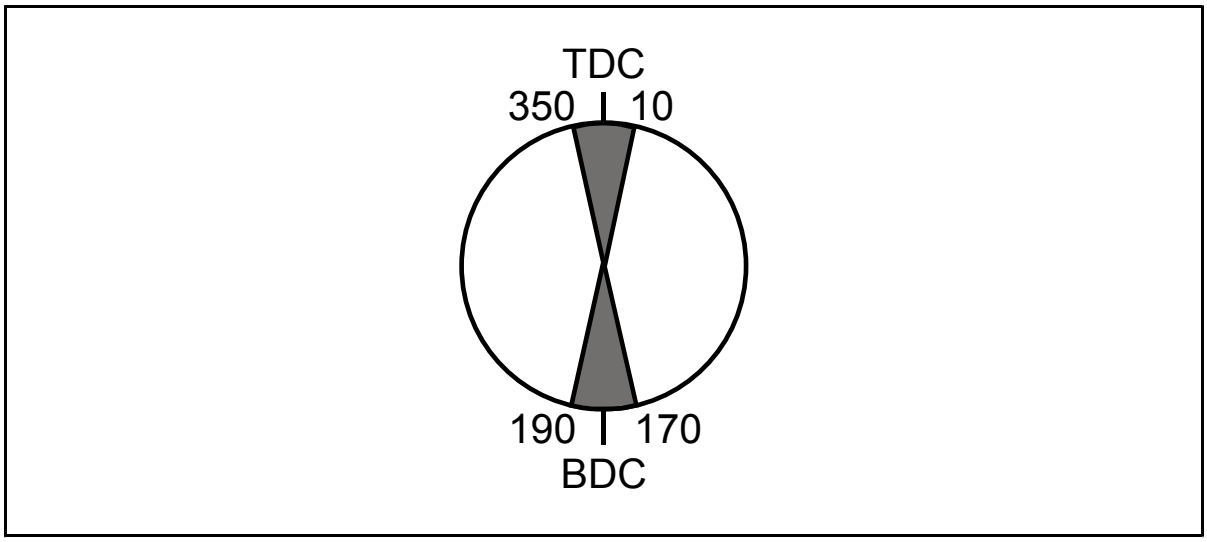


Figure 2-11. Where Ball Socket Mode Allows Ram Adjustment

(TDC & BDC ± 10°)

Ball Socket mode is not necessary for wrist-pin type shut height adjustment presses, but you can leave Ball Socket mode enabled if desired. To disable this feature see page 68.

Installing Counterbalance and/or Cushion Control Valve Package(s)

Figure 2-12 shows the valve package used for both counterbalance and cushion air pressure control. Figures 2-14 and 2-15 show typical counterbalance and cushion control installations.

> **NOTICE**
>
> **"CUSHION CONTROL" CAN BE USED TO CONTROL ANOTHER PRESSURE**
>
> The second pressure control option is called "cushion control" in this manual. However, you can rename it to something else (see page 76) and use it to control some other pressure instead, up to 150 PSI.

This manual describes only once how to install the valve package into the plumbing. In a later section of this chapter, the wiring of the valve packages will be described separately for counterbalance and cushion.

> **NOTICE**
>
> The valve package operates best with clean air. Be sure to maintain the filter installed at the inlet of the package. This valve package has no lubrication requirements.

Follow these steps to install each valve package:

1. Disconnect the shop air from the press.
2. Drain the counterbalance and/ or cushion air pressure system(s) of all air pressure.
3. Determine a convenient location to install the package keeping in mind that it should be accessible to use in the MANUAL mode. A good spot would be near the existing manual regulator for the system (either counterbalance or cushion).

> **NOTICE**
>
> You must set the existing manual regulator on the press to full open.

4. Mark the press where you will mount the valve assembly. Use the assembly as a template. Mount the valve with the filter's drain at the bottom (in the orientation shown in the illustrations in this chapter).
5. Drill and tap the two mounting holes (1/4-20). Mount the valve package, using bolts at least 2-1/2 inches long.
6. The valve package has standard ½" NPT plumbing connectors for both the inlet and outlet. Connect these into the existing system. Be sure to orient the valve package in the correct direction. The shop air inlet is the side with the manual regulator and the pressure gauge. The fill air for the counterbalance or cushion comes out opposite the shop air inlet, at the lockout valve. (See Fig. 2-7.)

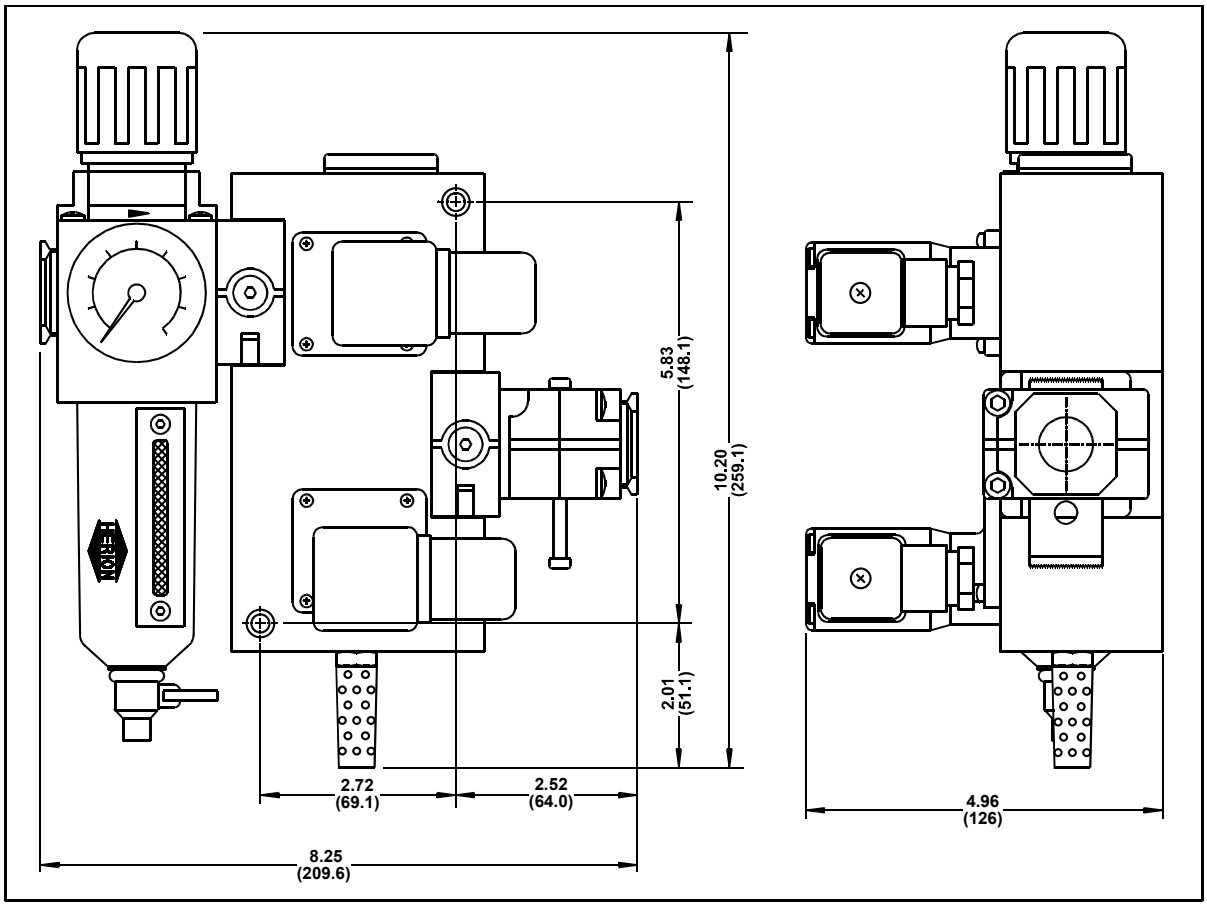


Figure 2-12. Valve Package Dimensions

Inches (millimeters)

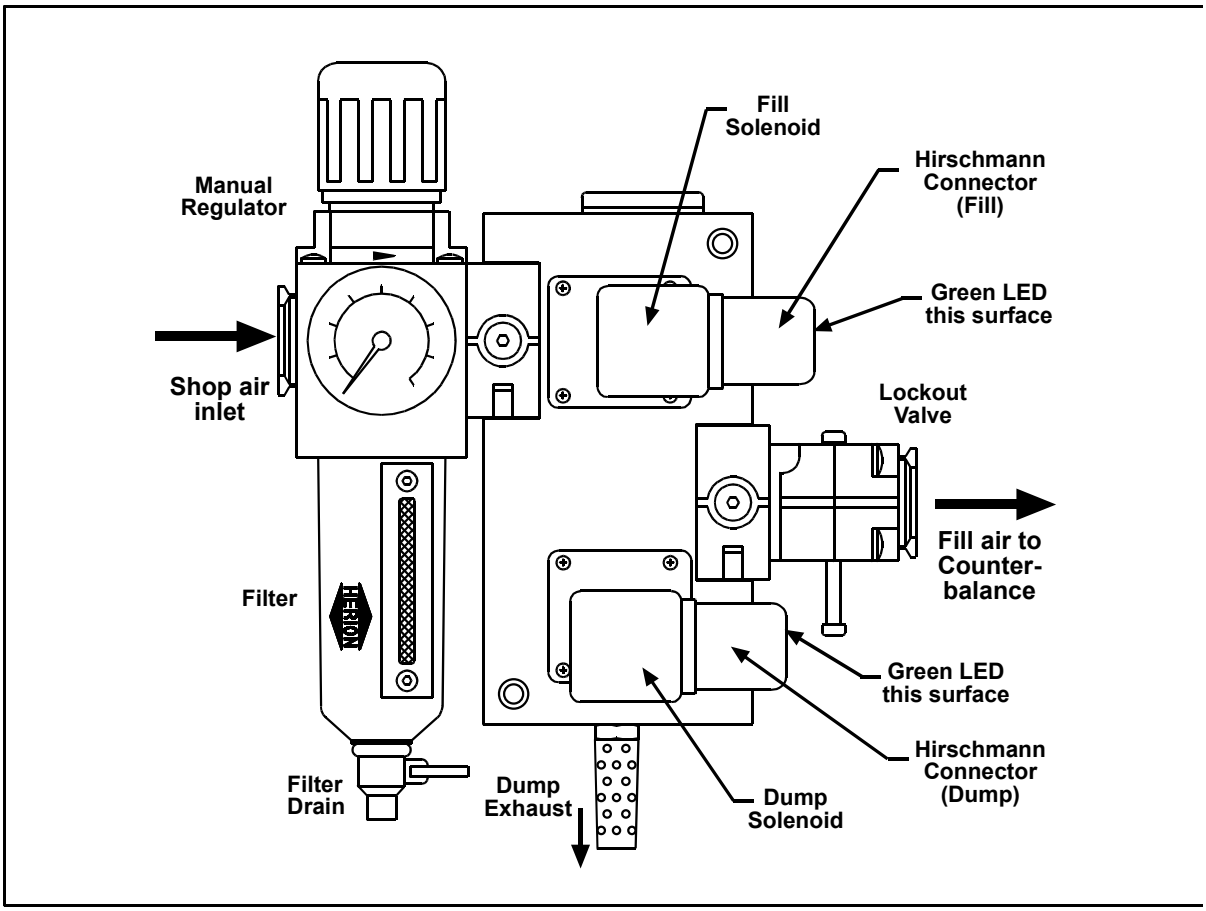


Figure 2-13. Parts of the Valve Package

NOTICE

You must set the manual regulator on the counterbalance valve package to 20 PSI more than the pressure necessary to balance the heaviest upper die that you will run on the press.

This protects the press if you switch RamPAC to MANUAL mode. In MANUAL mode, the counterbalance pressure goes to the value set on the manual regulator.

- Set the manual regulator on the valve package to the value shown below for counterbalance or cushion. Pull out the handle and turn the handle clockwise to increase the pressure, or counterclockwise to decrease the pressure setting.
- If this is the **counterbalance valve package**, set manual regulator on the valve package for 20 PSI more than the pressure necessary to balance the heaviest upper die that will run on the press. Set the regulator on the inlet line to full open
- If this is the **cushion valve package** (or is used to control another pressure), set the manual regulator on the valve package for 20 PSI more than the highest pressure setting you will set the cushion or other pressure to. Set the regulator on the inlet line to full open.

- If you have another valve package, return to step one and install it on the cushion.

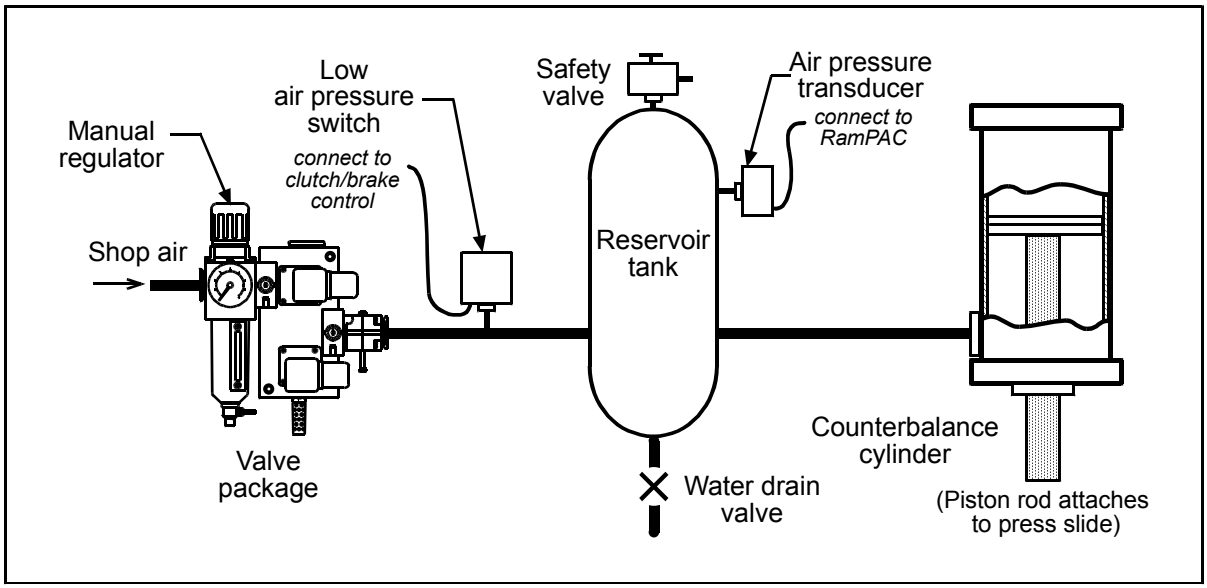


Figure 2-14. Typical Counterbalance Installation

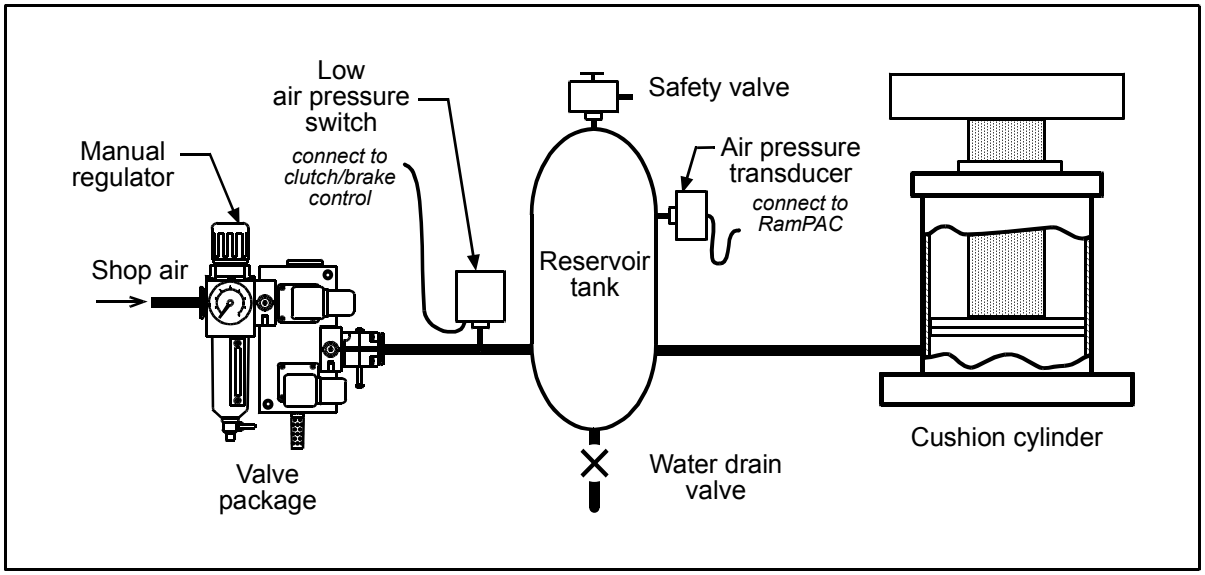


Figure 2-15. Typical Cushion Installation

Installing Counterbalance and/or Cushion Pressure Transducer(s)

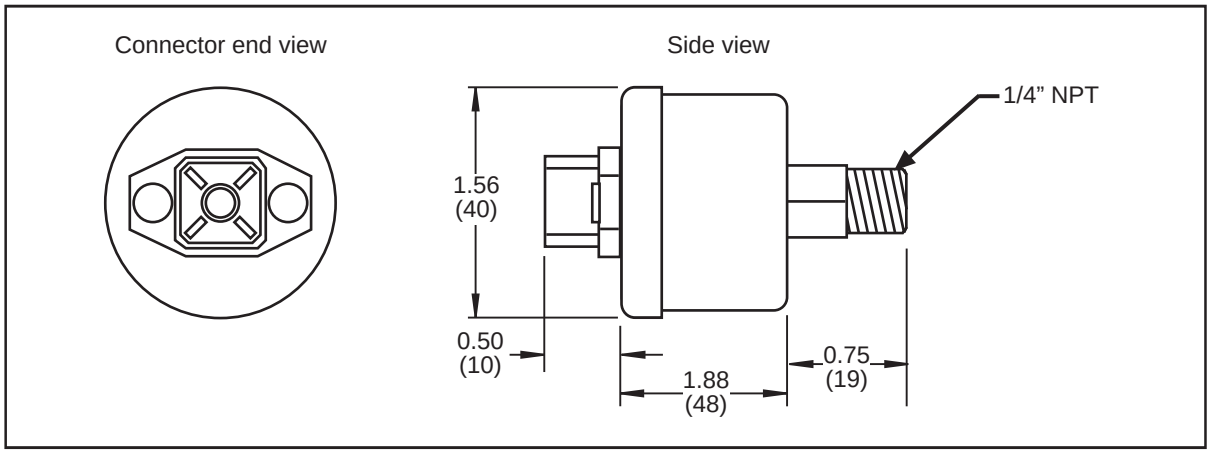


Figure 2-16. Air Pressure Transducer

(See Appendix B, page 133, for connector pinout)

The figure above shows the pressure transducer used by RamPAC for reading air pressure.

If you have both counterbalance and cushion controls, install one of these transducers for each system. This manual only explains how to install one. If you need to install two, follow these steps for each transducer. Refer to the figures on the following page for examples of counterbalance and cushion installations.

1. Disconnect shop air from the press; drain the counterbalance and/or cushion system(s).
2. Determine a convenient location on the reservoir tank to install the pressure transducer. Keep in mind that the transducer cable must be able to be connected and disconnected.

NOTICE

- If you are unable to install the pressure transducer directly on the reservoir tank, install it on the fill line after the valve package and as close as possible to the tank (as far as possible from the valve package).
- If you mount the transducer too close to the valve package, the transducer will see the "shop air pressure" (which is usually higher than the set point) whenever the fill valve opens, and RamPAC will not function properly.

NOTICE

- On some presses, instead of a reservoir tank there is a length of pipe extending from the counterbalance cylinder to serve as a reservoir. If this is the case on your press, install the pressure transducer in this length of pipe.

3. The transducer comes with a female ¼" NPT fitting. Place a fitting into the hole in the tank or the fitting in the pipe that will allow you to install the threaded end of the transducer.

4. Wrap the threaded end of the transducer with plumbing tape and put it into the fitting you installed in step 3.
5. If you have another transducer to install, repeat steps 1-4.
6. Reconnect the air pressure to the system(s) and check all air fittings, valves and transducers to make sure there are no leaks in the system(s).

NOTICE

- If your press has other counterbalance monitoring, make sure it does not interfere with RamPAC. If the press has a pressure transducer connected to the Wintriss Clutch/Brake Control (WPC), disconnect that transducer from the WPC, and install a pressure switch instead, as instructed in your WPC manual.

  You may be able to use the removed pressure transducer with RamPAC. Install it on the reservoir tank as described in the steps above. Call Wintriss Tech Support for assistance.
- If the press has a pressure switch for monitoring the minimum counterbalance pressure, change its setting to the pressure required to counterbalance the empty ram.

Installing RamPAC's Operator Switches

NOTICE

To install RamPAC operator switches in the optional switch enclosure, see the next section.

1. Locate the switches supplied with RamPAC. You will also find 3 labels. The labels and switches go together as follows:
   - RAM MODE – 3-position maintained keyswitch
   - RAM ADJUST – 3-position lever switch with spring return to center
   - RAM INTERRUPT – Momentary push button, normally closed

NOTICE

If your current ram adjust is configured with push buttons for up and down, you may choose to use them instead of the RAM ADJUST switch. In this case, you must still install the RAM MODE and RAM INTERRUPT switches.

2. Determine where you will install these switches. Keep in mind that easy access to the RAM INTERRUPT switch is important for stopping the ram adjust motor immediately. Punch or drill 1.20" (30.5 mm) holes for the switches.
3. Apply the stick-on labels above the holes.
4. Install the switches.

Installing the Optional Operator Switch Enclosure

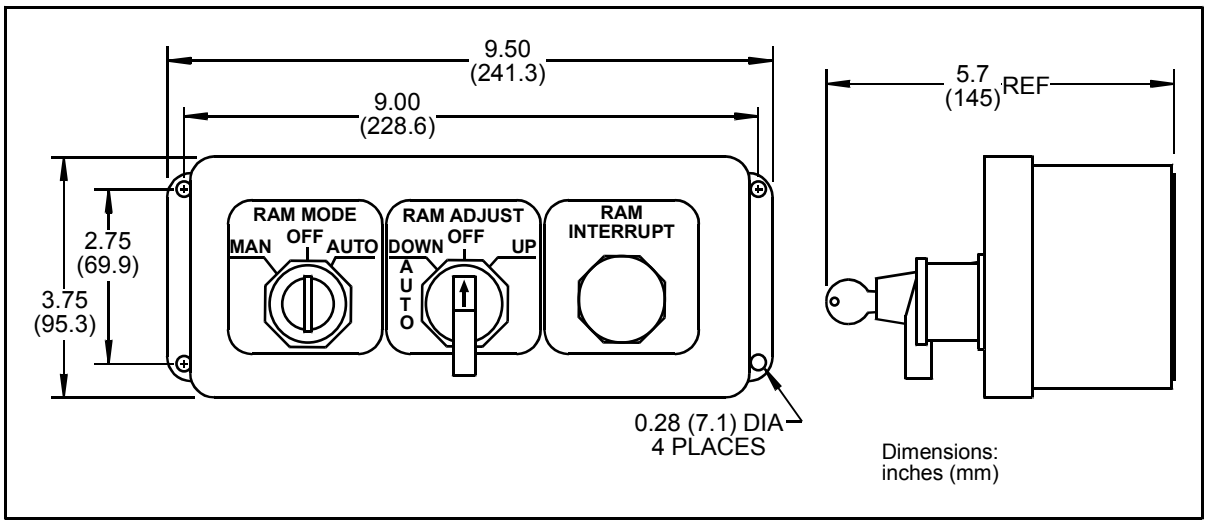


Figure 2-17. Operator Switch Enclosure

1. Determine where you will install the box. Keep in mind that easy access to the RAM INTERRUPT switch is important for stopping the ram adjust motor immediately. Remember that the switches must be wired directly to the RamPAC board. It is best to use a dedicated, liquid-tight, flexible conduit for the cables.
2. Determine the best place for the conduit to enter the enclosure, and punch or drill a hole for the size conduit you will be using.
3. Mark and drill holes to mount the enclosure.
4. Mount the enclosure using 4 screws with Loctite-blue, no. 242 or equivalent.

You are now ready to begin wiring RamPAC.

Wiring RamPAC

You will be making wiring connections between RamPAC and its sensors, its control switches, and SmartPAC. Refer to the following instructions, and the wiring schematics in wiring diagrams at the end of this manual.

> **⚠ WARNING**
>
> **ELECTRIC SHOCK HAZARD**
>
> - Disconnect all power to the press, press control, and other equipment used with the press.
> - Disconnect main power at SmartPAC *before* installation.
> - Also "tagout" per OSHA 1910.147 Control of Hazardous Energy (Lockout/Tagout).
> - Ensure that installation is performed by qualified personnel only.
>
> **Failure to comply with these instructions could result in death or serious injury.**

> **NOTICE**
>
> Do not combine low and high voltage wiring in the same conduit.

All wiring for the RamPAC should be enclosed in liquid-tight flexible conduit. Refer to the figure on page 36 for the RamPAC board layout and connector locations.

The following cables were supplied with your RamPAC (depending on your configuration):

2 – Communications cables (gray 4-conductor shielded – 30 or 100 feet) for the linear position transducer, and for communications between RamPAC and SmartPAC.

1 – Linear position transducer cable (black rubberized 6-conductor shielded cable with mating connector – 15 ft)

2 – Valve cables per valve assembly (black 3-conductor cable with black square mating connector – 6 feet)

> **NOTICE**
>
> Be sure to use the valve cables supplied with your RamPAC. These cables provide built-in noise suppression and include indicator LEDs that aid in troubleshooting.

First, connect sensors and communications; then wire the 115V power lines to the ram motor, valves, and RamPAC. Do not apply power to the RamPAC until all connections have been made.

Terminating Cable Shields

RamPAC has ground studs on the inside of the enclosure for terminating cable shields at their point of entry. Follow the instructions below for terminating the shield to the studs in the enclosure. If your enclosures do not have ground studs provided, use bonding locknuts, which you can obtain by calling Wintriss Tech Support.

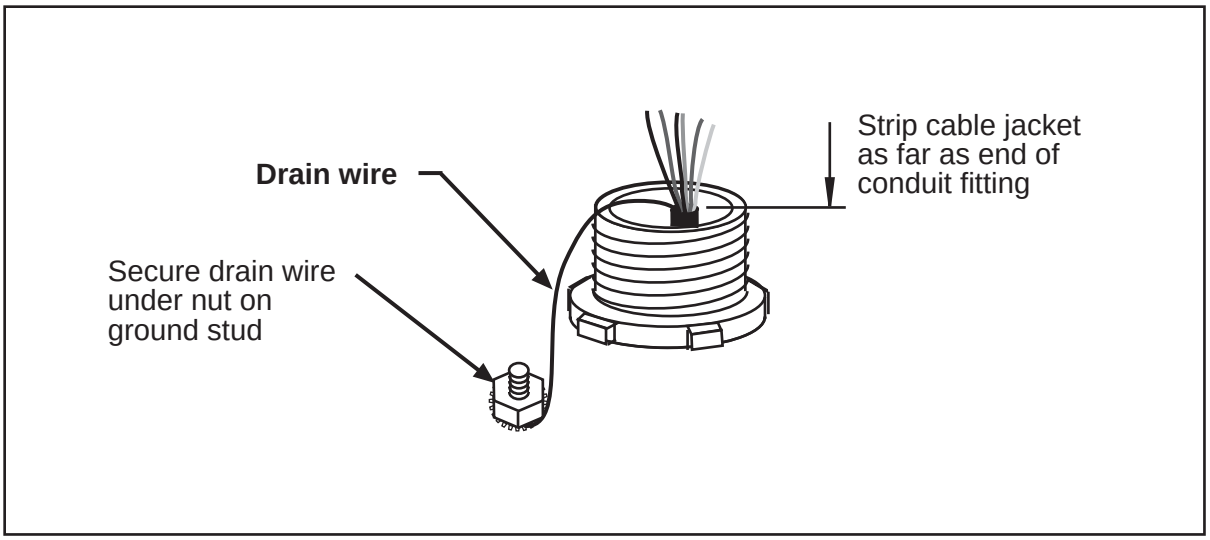


Figure 2-18. Connecting Shield Drain Wire to Ground Stud

For each shielded cable, perform the following steps. Refer to the figure above.

1. Strip the cable jacket as far as the end of the conduit fitting.
2. Cut the drain wire to a length that it can wrap at least once around the nearest grounding stud. Loosen the nut on the stud, wrap the drain wire around clockwise and tighten down.
3. Connect the rest of the wires in the cable to the terminal block as instructed in this chapter.

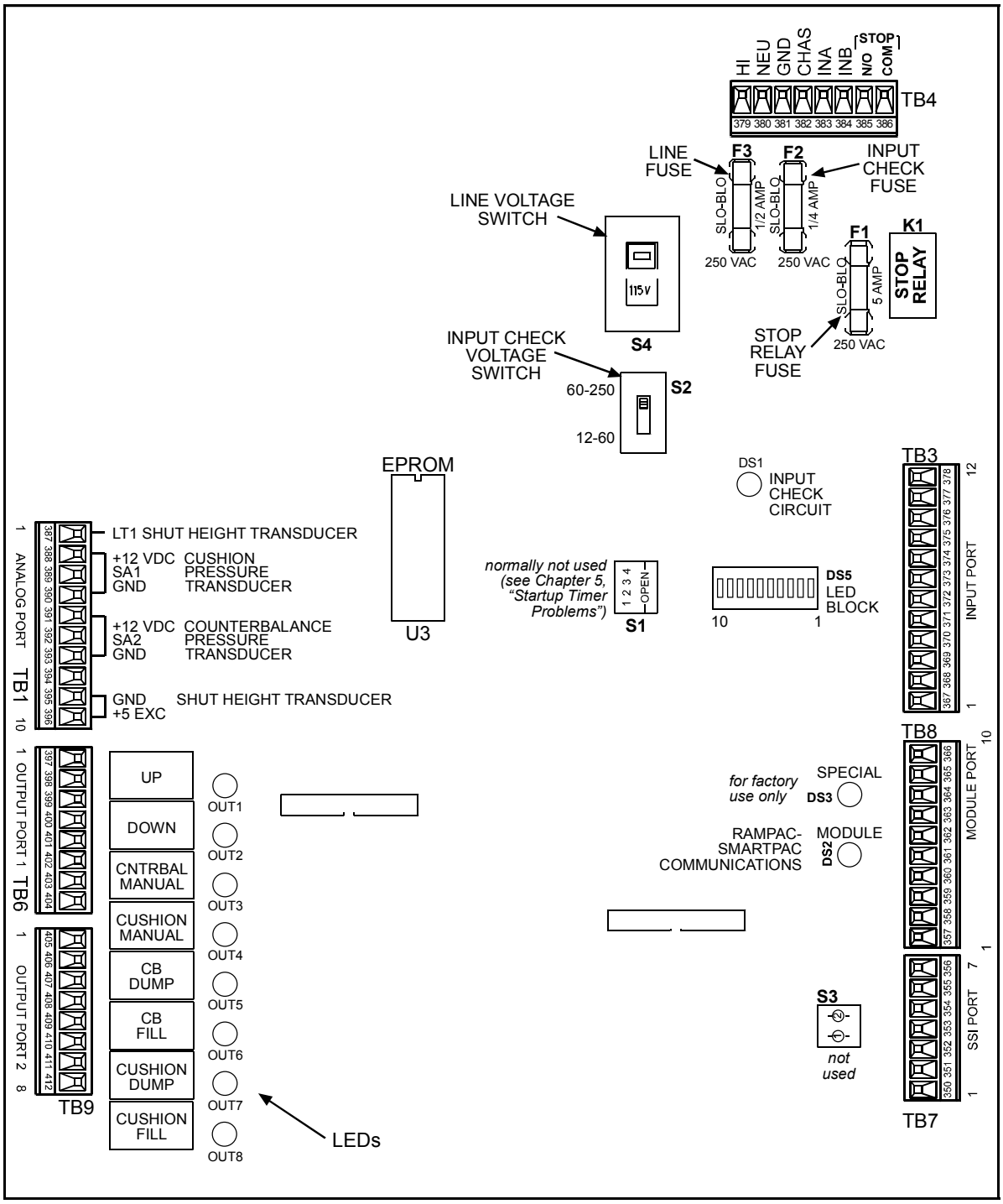


Figure 2-19. RamPAC Board Layout

(See "Using Control Board LEDs," page 112, for LED information)

Wiring Linear Position Shut Height Transducer

NOTICE

It is best to have the ram at bottom dead center with the shut height adjustment at its lowest position when running these wires.

1. Locate the following provided items you will need to connect the position transducer to RamPAC:
   - Four-conductor shielded cable with no connector. (You should have two of these cables. The linear position transducer cable likely be the longer of the two. The other cable is for communications between SmartPAC and RamPAC.)
   - Six-conductor shielded cable (black) with a black connector at one end
   - Small junction box with terminal strip installed inside.
   - Cord grip
2. Find a suitable location on the crown of the press to mount the junction box. Remember, you will be running a cable directly from the transducer to this box; try to position it as close as possible to the transducer. Figure 2-20 shows the junction box dimensions. Figure 2-21, shows a typical mounting location.

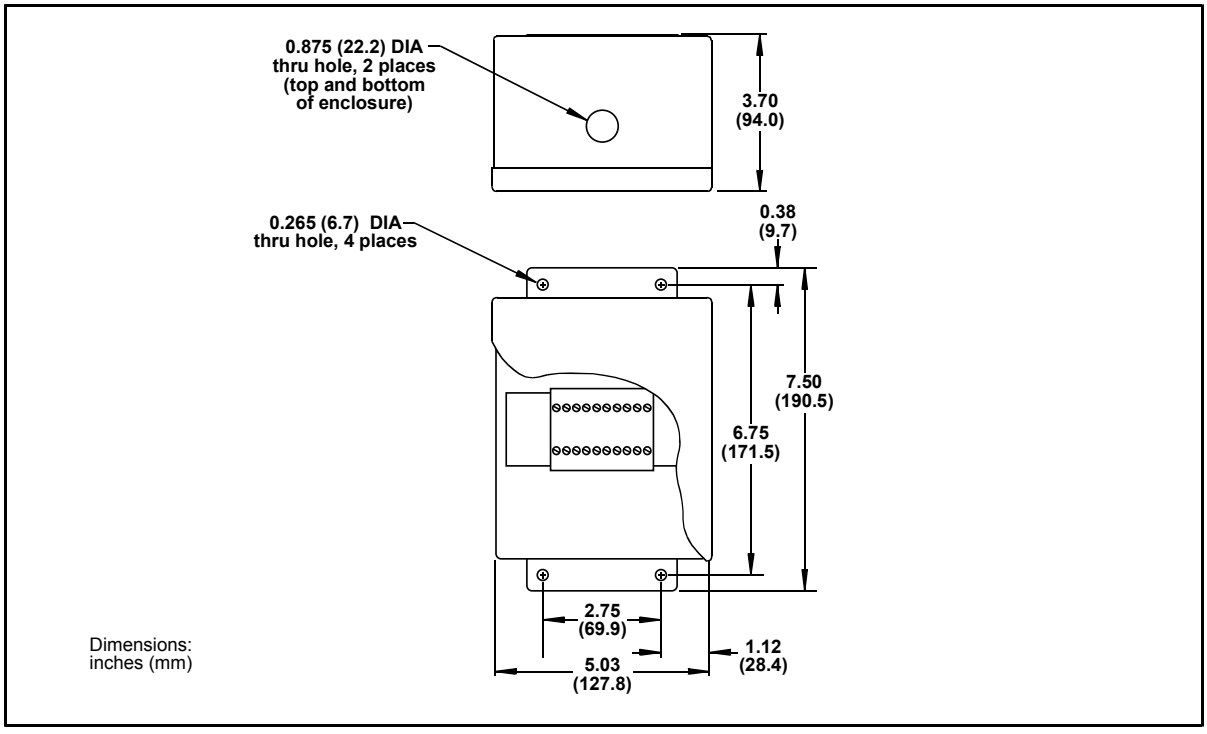


Figure 2-20. Junction Box Dimensions

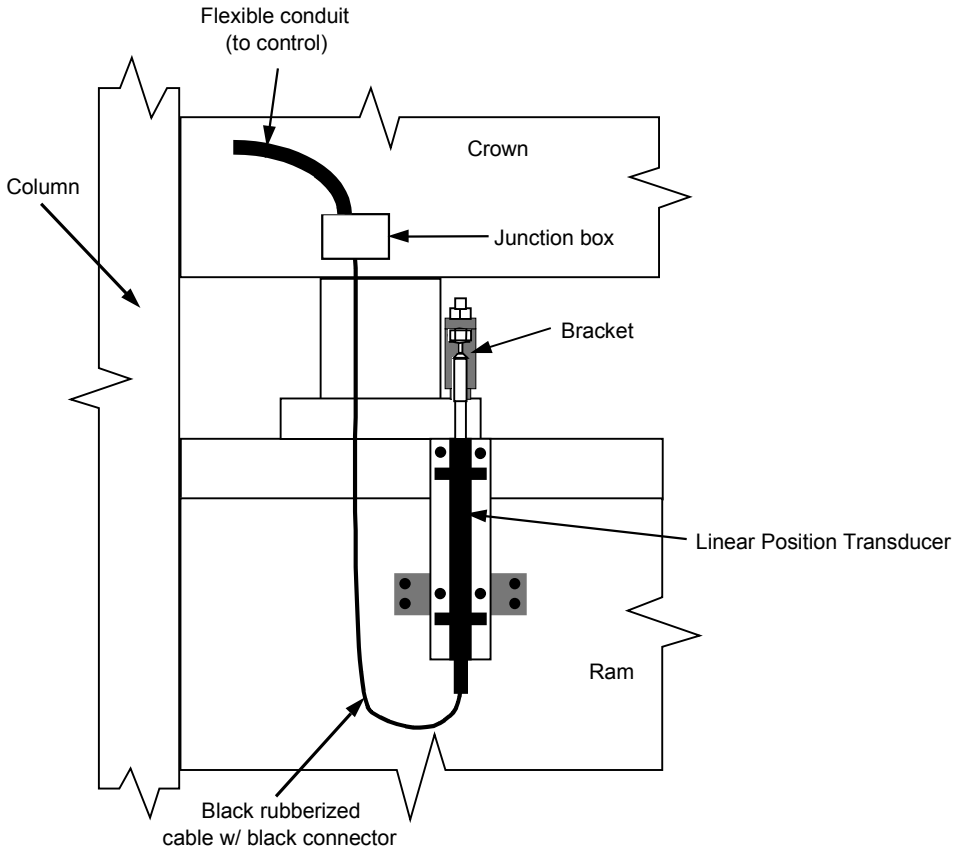


Figure 2-21. Possible Location for Transducer Junction Box

3. Mount the junction box to the crown of the press.
4. Connect the black cable to the transducer.
5. Run the cable into the junction box, through the cord grip. Keep in mind that you should leave a service loop at the transducer end. Also, do not run this cable tightly between the two points or place it in any type of conduit (flexible or rigid). This cable must be able to flex as the press cycles at any shut height setting.
6. Run a liquid tight conduit from the junction box (on the crown) to the RamPAC control enclosure.
7. Run the gray, 4-conductor shielded cable through this conduit
8. Strip the end of all wires of both cables inside the junction box. Connect the cables to the terminal strip according to the figure below. The cable from the transducer has two wires connected to each terminal to give it greater reliability.

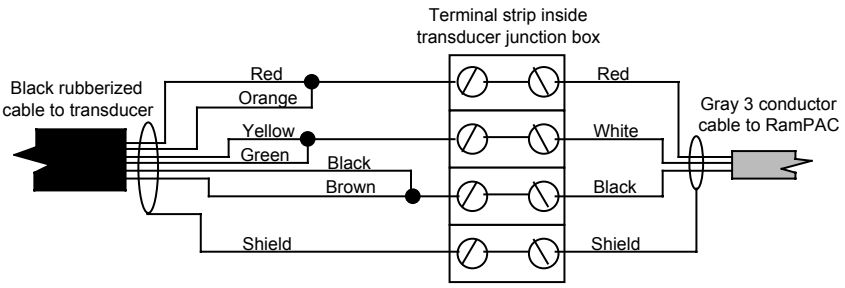


Figure 2-22. Transducer Wiring in Junction Box

10. Strip the gray cable at the control end. Leave enough slack to have a service loop. Connect this cable to **TB1** according to the following table.

Table 2-1. Wiring Between RamPAC and Transducer Junction Box

Pin # @ RamPAC TB1 Analog port	Gray cable from Junction box (wire color)
396 (+5 VCC Excitation)	Red
387 (LT 1)	White
395 (GND)	Black

NOTICE

Terminate the cable shield to a ground stud close to the entry point inside the RamPAC or SmartPAC enclosure.

Wiring the Cable Extension Position Transducer

The Hirschmann connector on the transducer comes from the factory at the 12 o'clock position (see next figure). If during installation you find you need the connector in a different position (on one of the sides, rather than the top of the housing), rotate the connector half of the housing as follows:

1. Loosen the four housing screws that hold together the two halves of the transducer housing.
2. Rotate the half with Hirschmann connector 90 degrees to the left or to the right.
3. Reassemble the halves of the housing, being careful to re-seat the o-ring between the two halves so it makes a good seal. (See figure on page 40 for the housing screws location).

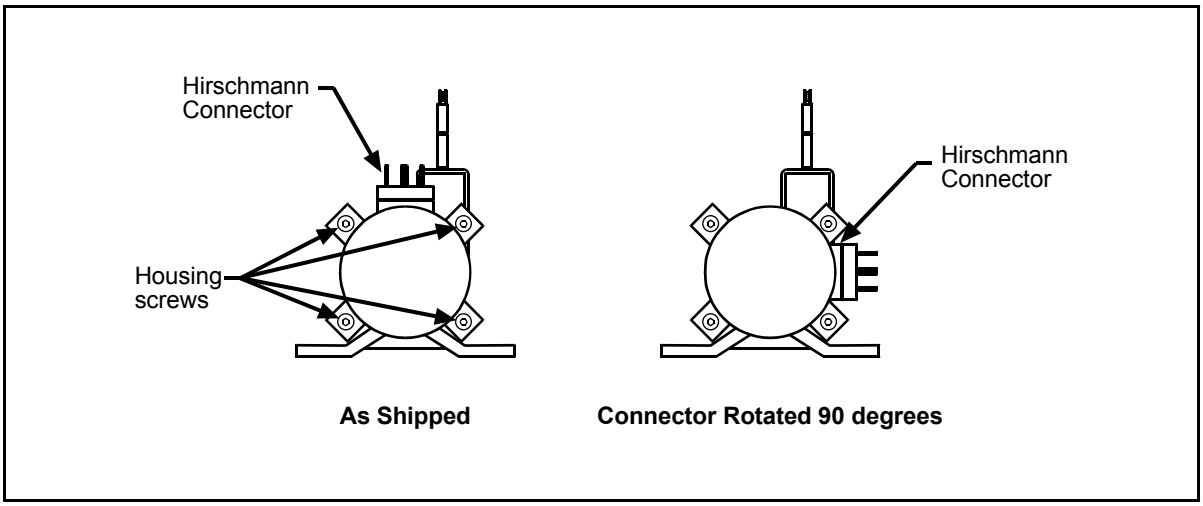


Figure 2-23. Changing Orientation of the Transducer Connector

Wire the transducer as follows:

1. Connect the 15’ black cable (provided) with the square Hirschmann plug onto the transducer and run the cable back to the junction box.
2. Run the 30’ or 100’ gray comms cable (provided) from the junction box back to the RamPAC board.
3. Connect the wires, referring to wiring diagram Figure 1 at the end of this manual and the shield termination instructions on page 34.
4. When you have completed the wiring, go to the next section.

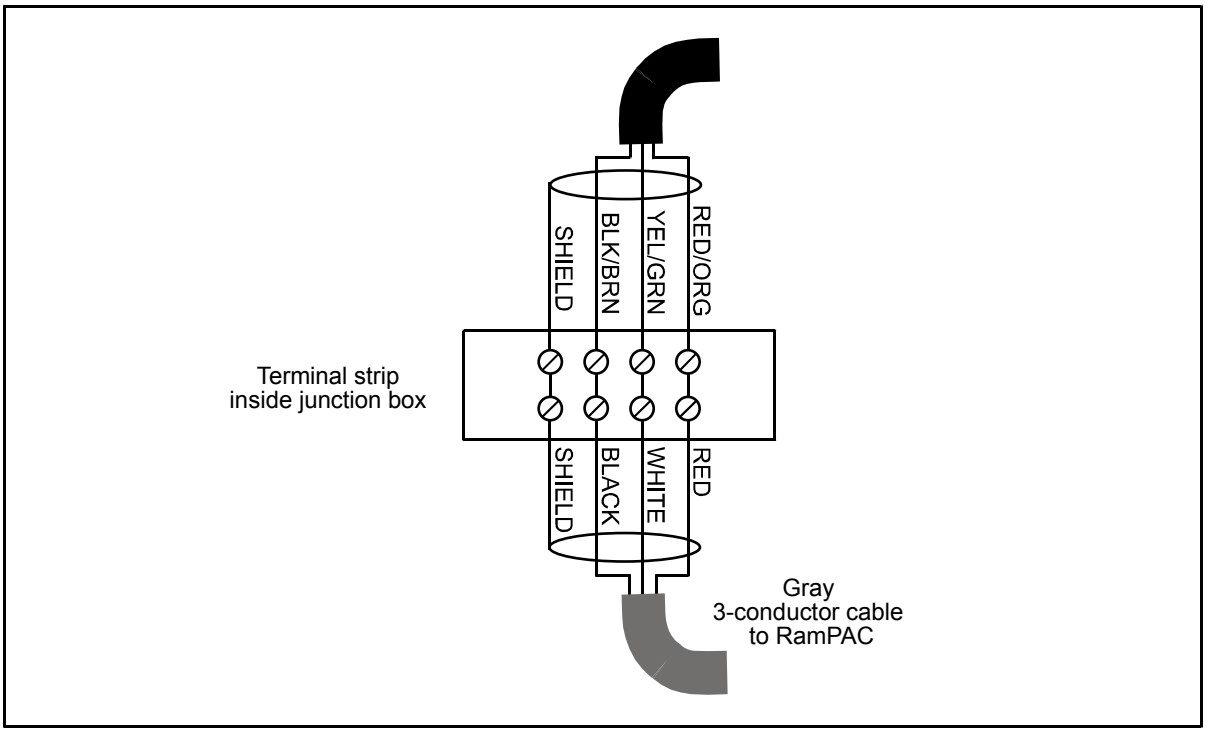


Figure 2-24. Wiring the Cable Extension Shut Height Transducer

Wiring Pressure Transducer(s)

Follow these steps to connect the pressure transducer(s) for counterbalance and/or cushion control.

1. Begin by locating the cable for the transducer. It is a gray cable with a gray connector at one end. The connector plugs into the transducer.

> **NOTICE**
> RamPAC pressure transducers normally come pre-wired with the connector that attaches to the transducer. If you wire your own cable to the connector, follow the instructions in Appendix B (page 133).

2. Feed the cable through the conduit from the transducer to the RamPAC enclosure.
3. Locate **TB1** on the RamPAC board (see figure on page 36). Cut the cable so you have enough left to use as a service loop to unplug the connector.
4. Strip off the gray cable jacket to reveal approximately 2" of the 3 wires (red, black, and white) and the shield inside. Strip the end of each insulated wire so approximately ¼ inch of bare wire is exposed.
5. Connect the wires for the **counterbalance transducer** to **TB1** according to the following table. Terminate the shield drain wire to one of the ground studs on the inside of the enclosure. (See "Terminating Cable Shields," page34.)

Table 2-2. Wiring Between RamPAC and Counterbalance Pressure Transducer

RamPAC TB1 Analog port Pin # (connection)	At Pressure transducer Pin # (wire color)
391 (+12VDC)	4 (RED)
392 (SIGNAL)	2 (WHITE)
393 (GND)	3 (BLACK)
Terminate to ground stud inside enclosure near entry point	1 (shield)

> **NOTICE**
> If you do not have cushion control, you do not need to complete step 6. Go ahead to the next section, "Wiring Between RamPAC and SmartPAC," page 43

6. Connect the wires for the **cushion pressure transducer** to **TB1** according to the following table. Terminate the shield drain wire to one of the ground studs on the inside of the enclosure. (See "Terminating Cable Shields," page 34.)

Table 2-3. Wiring Between RamPAC and Cushion Pressure Transducer

RamPAC TB1 Analog port Pin #	Pressure transducer Pin # (wire color)
388 (+12VDC)	4 (RED)
389 (SIGNAL)	2 (WHITE)
390 (GND)	3 (BLACK)
Terminate to ground stud inside enclosure near entry point	1 (shield)

Wiring Between RamPAC and SmartPAC

A number of connections must be made between the RamPAC and SmartPAC in order for RamPAC to operate properly, including communications, E-stop, input check and zero cam. Follow the instructions below to make these connections.

Communications Wiring Between RamPAC and SmartPAC

1. Locate the 4-conductor shielded cable without connector. You will use this wire for communications.
2. Wire the connections as shown in the table below and the wiring diagrams at the end of the manual. Locate **TB102** on the SmartPAC board (consult your SmartPAC manual) and **TB8** on the RamPAC board. (See page 36 for the location of components.)
3. If RamPAC and SmartPAC are in separate enclosures, run the cable through flexible liquid-tight conduit between RamPAC and SmartPAC. This conduit should contain only low voltage wiring. If they are in the same enclosure or console, be sure to keep the cable away from any high-voltage wires within the enclosure or console.

NOTICE

If you are installing RamPAC on a system that has a Wintriss Tonnage Monitor (AutoSetPAC or WaveFormPAC), you will notice that RamPAC uses the same communications (module) port as the tonnage monitor at the SmartPAC. This is correct; these products were designed this way.

Table 2-4. Communications Wiring between RamPAC and SmartPAC

RamPAC TB8 Module port Pin #		SmartPAC TB102 Module port Pin #	
ground stud in RamPAC enclosure	GND/SHLD	ground stud in SmartPAC enclosure	GND/SHLD
363	(+RXD2)	243	(+TXD2)
364	(-RXD2)	244	(-TXD2)
365	(+TXD2)	241	(+RXD2)
366	(-TXD2)	242	(-RXD2)

Wiring RamPAC's E-stop Output

This stops the press when an error is generated. RamPAC **TB4** pins #**385** and #**386** on**,** should be wired into the SmartPAC's Emergency Stop circuit. Refer to the wiring diagrams at the back of this manual for proper wiring. Keep in mind that this is a *series* connection, not parallel. Keep these wires away from any high-voltage lines. You can run them with other *low-voltage* lines.

> **CAUTION**
>
> **NO STOP SIGNAL WHEN FAULT GENERATED**
>
> Connect RamPAC **TB4** Pins **# 385** and **# 386** into the E-stop circuit. If you do not do this, RamPAC will not stop the press when a fault is generated.
>
> **Failure to comply with these instructions could result in property damage.**

Wiring Input Check Circuit

The Input Check signal tells RamPAC that the clutch is engaged and the press is running. When the press is running, RamPAC prevents access to some if its functions, such as shut height adjustment. Wire the input check as follows:

1. Locate RamPAC **TB4** pins #**383** [A] and #**384** [B] and SmartPAC **TB101** pins #**205** [A] and #**206** [B].
2. Locate switch S2 on the RamPAC Board. This is the input check selector switch. The input check can be anywhere from 12 to 250 VAC or VDC. Make sure it is set the same as S101 on the SmartPAC
3. Connect these according to the following table. These wires can be either low or high voltage. Refer to step 2 above to see where the switch was set to determine what voltage these wires are.

Table 2-5. Input Check Wiring between RamPAC and SmartPAC

RamPAC TB4 Main Power Pin #		SmartPAC TB101 Main Power Pin #	
383	(Input A)	205	(A)
384	(Input B)	206	(B)

Wiring Zero Cam Signal to RamPAC

RamPAC needs to receive the zero cam signal from SmartPAC to know when the press reaches the top of the stroke. Connect RamPAC **TB3** pin #**376** [Input 8] to SmartPAC **TB101** pin #**211** [Zero Cam]. This wire should be run with other *low voltage* lines. It will be shared with the AutoSetPAC if you have one with your system.

Wiring E-stop as an Input to RamPAC

RamPAC stops the ram adjustment motor when you press the Ram Interrupt button on the RamPAC control. In addition, you may want to wire RamPAC into the press's E-stop circuit so the ram adjustment motor stops when you push an E-stop button.

To connect into the E-stop circuit, connect RamPAC **TB3** pins #**367** (+12V) and #**377** (Ram Stop) to a relay that follows the E-stop circuit. If you have a WPC as your press control, you can simply connect RamPAC **TB3** pin #**377** (Ram Stop) to WPC pin **#57** on WPC. If you choose not to have this option, place a jumper on RamPAC **TB3** between pins **367** and **377**.

CAUTION

RAMPAC WILL NOT STOP RAM ADJUSTMENT MOTOR WHEN E-STOP BUTTON IS PRESSED

Connect RamPAC **TB3** pin **#377** into the press's E-stop circuit. If you do not connect RamPAC into the E-stop circuit, the ram will continue to move when you push an E-stop button during shut height adjustment.

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

CAUTION

OVERVOLTAGE

Use the E-stop circuit at 24 VDC, maximum.

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

NOTICE

For a 120 VAC circuit, you will need an extra 120 VAC dry contact relay.

Wiring Ram Adjust Motors to RamPAC

Connect the ram adjust motors to RamPAC by following the instructions below. Refer to the next table, the figure on page 36, the wiring diagrams on pages 47 and 48 and the wiring diagrams at the end of the manual.

> **NOTICE**
>
> All key switches and push buttons in your current ram adjust circuit should be removed from the circuit. They will be replaced with the relays on RamPAC's board. If your ram adjust circuit has mechanical limit switches in it already, you should leave them in the circuit for added protection.

> **NOTICE**
>
> Be sure to run the wiring for the motor starters with wires carrying the same approximate voltage; always keep high-voltage and low-voltage wires away from each other.

1. Locate **TB6** on the RamPAC board (see Figure 2-19, page 36). This is one of the connectors for the relay outputs.
2. Connect supply voltage for your ram adjust motor starter to RamPAC **TB6** pin **#397** (see table and figure below).
3. On **TB6**, jump pin **#397** to pin **#399**.
4. If your motor starter does not already have noise suppression devices (pactrons) installed, use two of the suppressers (plastic cubes with 2 black leads) supplied and install them across the coils. This will suppress any noise spikes created when the starter is engaged.
5. Connect RamPAC **TB6** pin **#398**, to one side of the up starter solenoid for the ram motor. The other side of this solenoid should be connected to neutral already. See your main control's wiring diagrams to find out where to install this wire.
6. Connect RamPAC **TB6** pin **#400**, to one side of the down starter solenoid for the ram motor. The other side of this solenoid should be connected to neutral already.

The figures on pages 47 and 48 show examples of a ram adjust circuit before and after it was modified with RamPAC.

Table 2-6. Wiring RamPAC to ram adjust motors

TB6 connection Pin #	Wire to
397	Ram adjust motor starter supply voltage
Wire a jumper between pins #397 and #399	(No external connection)
398	One side of up starter solenoid (other side connected to neutral)
400	One side of down starter solenoid (other side connected to neutral)

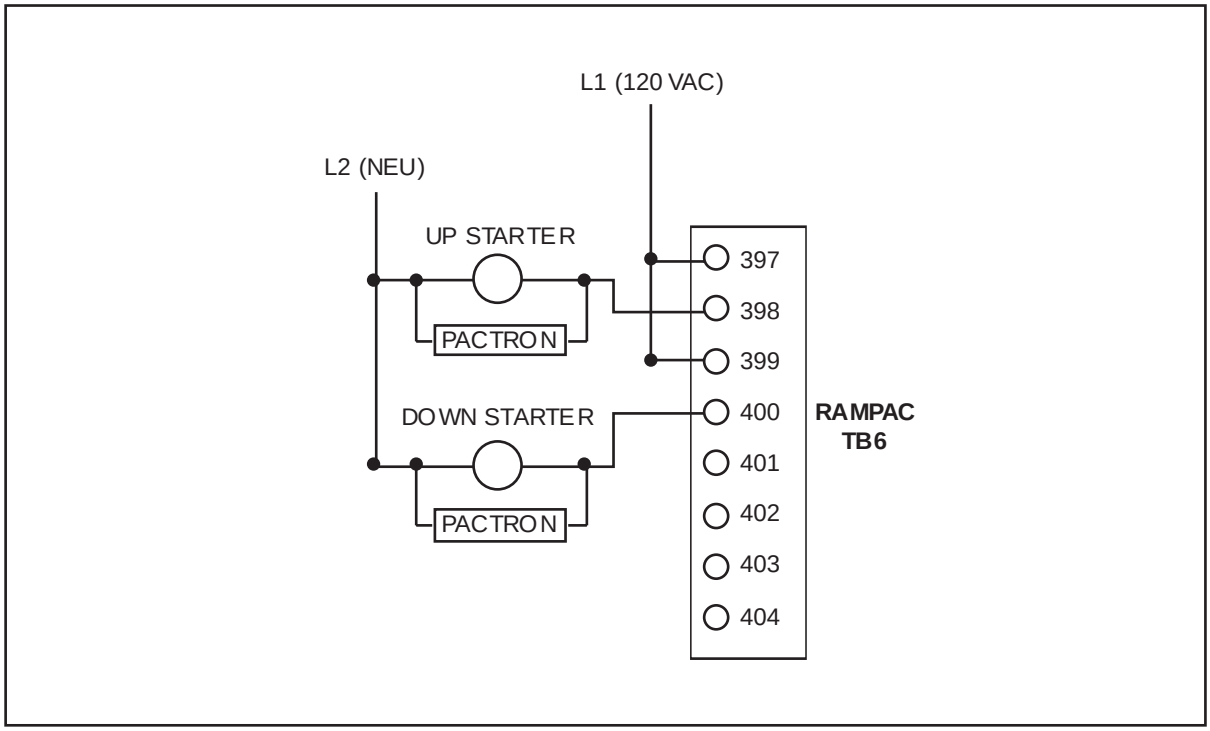


Figure 2-25. Wiring Ram Adjust

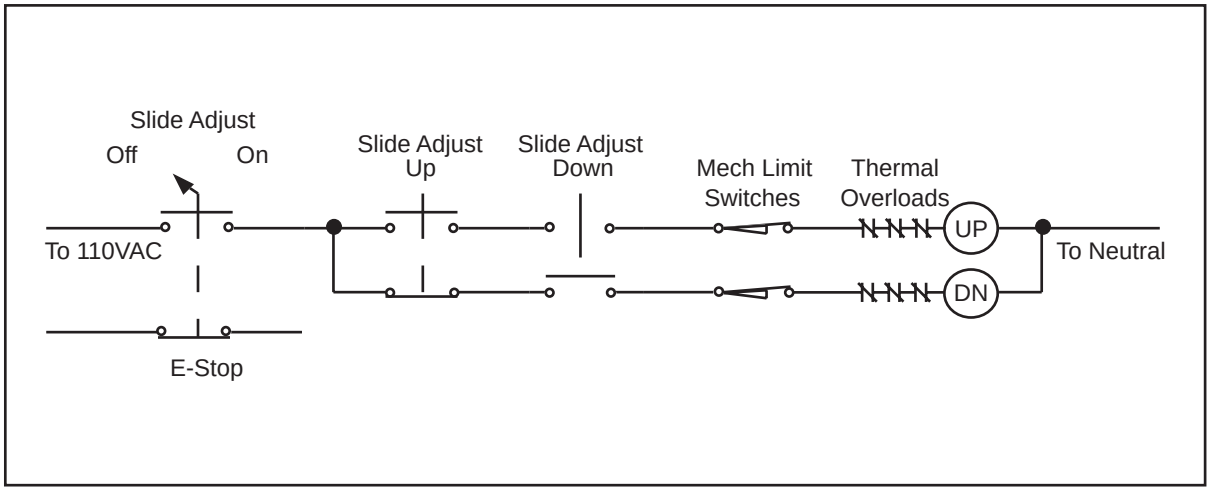


Figure 2-26. Sample of Existing Ram Adjust Circuit

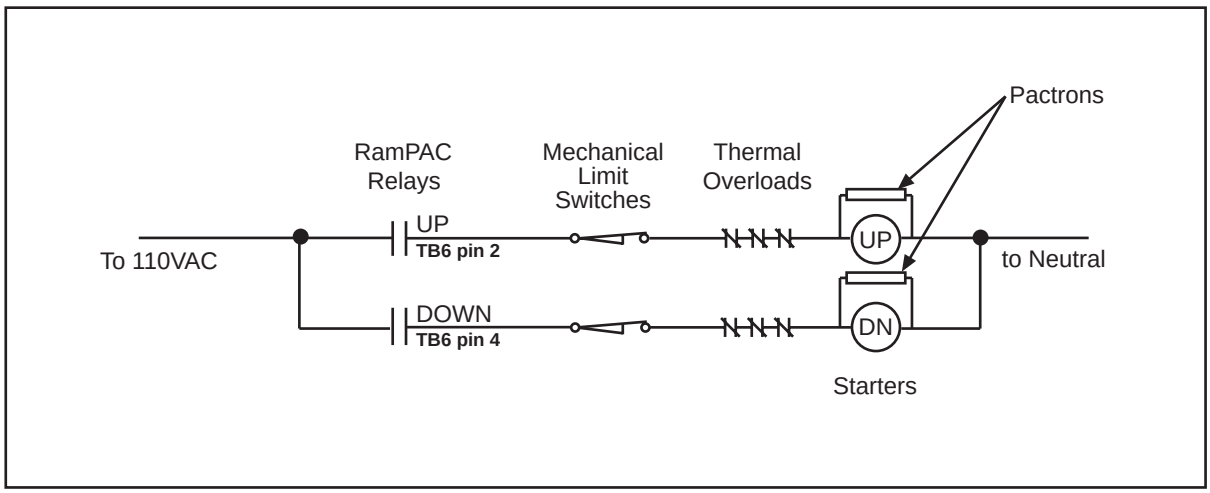


Figure 2-27. Same Ram Adjust Circuit Modified with RamPAC

Wiring Operator Controls to RamPAC

NOTICE

These operator controls are low-voltage. You can run their wiring through conduit with other low-voltage wires. Do not run them with high-voltage wires.

The figure below shows the wiring scheme for the RamPAC controls.

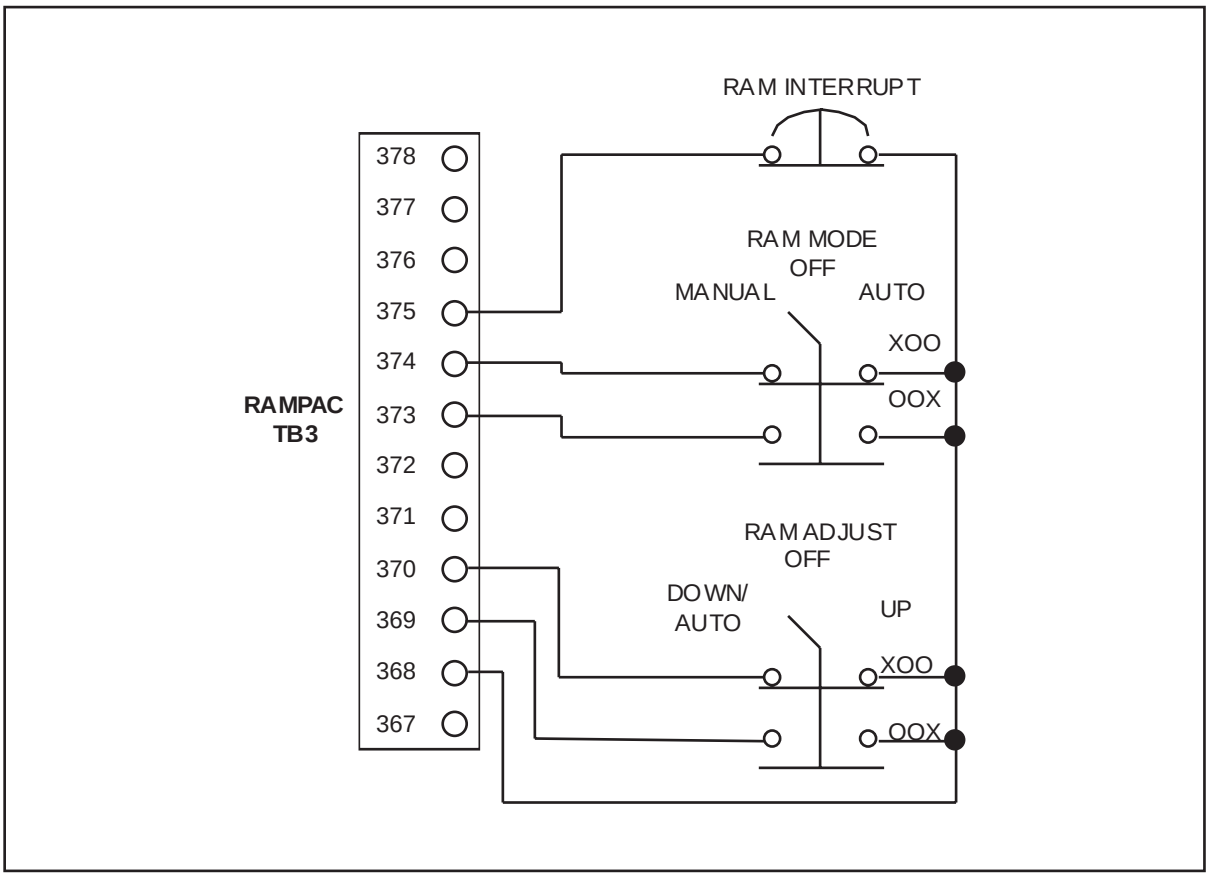


Figure 2-28. Operator Control Wiring

Wiring Counterbalance Valves to RamPAC

NOTICE

Be sure to use the valve cables supplied with your RamPAC. These cables provide built-in noise suppression and include indicator LEDs that aid in troubleshooting.

1. Locate the cables supplied for the valves. They are black 3-conductor cables with a square connector at one end. These cables have noise suppression built into the connector so you will not need to install external suppression on these valves.
2. Each connector has a blank white label on it. Write "FILL" on one of them and "DUMP" on the other. Attach the cable marked "FILL" to the upper solenoid in the valve package, which is closest to the manual regulator (see figure, page 28). Attach the cable marked "DUMP" to the lower solenoid (closest to the Dump exhaust muffler).
3. Both of these cables need to be run to a junction box close to the solenoids. If one is already there and close enough, make sure it contains 115 VAC or greater wiring. If it does, you may use that box. If it contains low voltage, or there is not a box close enough to use, you must install a new one.
4. Connect the cables according to the following tables:

Table 2-7. Counterbalance *FILL* Solenoid Connections

Pin # at Solenoid (color)	Connection
1 (BROWN)	Pin #408 – RamPAC **TB9**
2 (BLUE)	NEUTRAL*
3 (GREEN/YELLOW)	GROUND*

*These connections do not have to be made at RamPAC's control. You can use existing neutral and ground (from 120v circuit) for these connections.

Table 2-8. Counterbalance *DUMP* Solenoid Connections

Pin # at Solenoid (color)	Connection
1 (BROWN)	Pin #406 – RamPAC **TB9**
2 (BLUE)	NEUTRAL*
3 (GREEN/YELLOW)	GROUND*

*These connections do not have to be made at RamPAC's control. You can use existing neutral and ground (from 120v circuit) for these connections.

5. Connect 120VAC to RamPAC **TB9** pin #**405**.
6. On RamPAC **TB9**, jump pin #**405** to pin #**407**.

Table 2-9. Other Counterbalance Connections

RamPAC TB9 connection Pin #	Wire to
405	120 VAC
Wire a jumper between pins #405 and #407	(No external connection)

Wiring Counterbalance Manual Solenoid (When Required)

Some counterbalance valve packages (not provided by Wintriss Controls) include a third solenoid to control the air when RamPAC is in MANUAL mode. If you have this type of valve package, wire the manual solenoid to the RamPAC as shown below.

1. Connect one of the solenoid cables to the Manual solenoid for the counterbalance.
2. Install a Pactron across the coil.
3. Run the cable to a junction box close to the valve package, as described in the previous section.
4. Connect the cable according to the following table:

Table 2-10. Counterbalance *Manual* Solenoid Connections

Connection at Solenoid Package	RamPAC Connection
SIGNAL	Pin **#402** – RamPAC **TB6**
NEUTRAL	NEUTRAL*
GROUND	GROUND*

*These connections do not have to be made at RamPAC's control. You can use existing neutral and ground (from 120v circuit) for these connections.

Wiring Cushion Valves to RamPAC

NOTICE

- You can use the "cushion control" function to control another pressure, up to 150 PSI (see page 76).
- Be sure to use the valve cables supplied with your RamPAC. These cables provide built-in noise suppression and include indicator LEDs that aid in troubleshooting.
- If you are using RamPAC's cushion control, but need to dump the cushion pressure to 0 (zero) under some conditions, set the cushion operating mode to MANUAL (see page 84) and set the manual regulator on the cushion valve package to 0 (zero).

1. Locate the cables supplied for the valves. They are black 3 conductor cables with a square connector at one end. These cables have noise suppression built into the connector so you will not need to install external suppression on these valves.
2. Each connector has a blank white label on it. Write "FILL" on one of them and "DUMP" on the other. Attach the cable marked "FILL" to the solenoid in the valve package closest to the manual regulator (see the figure on page 28). Attach the cable marked "DUMP" to the other solenoid (closest to the Dump exhaust).
3. Both of these cables need to be run to a junction box close to the valve package. If one is already there and close enough, make sure that it contains 115VAC or greater wiring. If it does, you may use that box. If it contains low voltage, or there is not a box close enough to use, you must install a new one.
4. Connect the cables according to the following tables:

Table 2-11. Cushion *FILL* Solenoid Connections

Pin # at Solenoid (color)	Connection
1 (BROWN)	Pin #412 – RamPAC **TB9**
2 (BLUE)	NEUTRAL*
3 (GREEN/YELLOW)	GROUND*

*These connections do not have to be made at RamPAC's control. You can use existing neutral and ground (from 120v circuit) for these connections.

Table 2-12. Cushion *DUMP* Solenoid Connections

Pin # at Solenoid (color)	Connection
1 (BROWN)	Pin #410 – RamPAC **TB9**
2 (BLUE)	NEUTRAL*
3 (GREEN/YELLOW)	GROUND*

*These connections do not have to be made at RamPAC's control. You can use existing neutral and ground (from 120v circuit) for these connections.

5. Connect 120VAC to RamPAC **TB9** pin #**409**.
6. On RamPAC **TB9**, jump pin #**409** to pin #**411**.

Wiring Cushion Manual Solenoid (When Required)

Some cushion valve packages (not provided by Wintriss Controls) include a third solenoid to control the air when RamPAC is in MANUAL mode. If you have this type of valve package, wire the manual solenoid to the RamPAC as shown below.

1. Connect one of the solenoid cables to the Manual solenoid for the cushion.
2. Install a Pactron across the coil.
3. Run the cable to a junction box close to the valve package, as described in the previous section.
4. Connect the cable according to the following table:

Table 2-13. Cushion *Manual* Solenoid Connections

Pin # at Solenoid (color)	Connection
1 (BROWN)	Pin #404 – RamPAC **TB6**
2 (BLUE)	NEUTRAL*
3 (GREEN/YELLOW)	GROUND*

*These connections do not have to be made at RamPAC's control. You can use existing neutral and ground (from 120v circuit) for these connections.

Optional Wiring When RamPAC Is On But Air Compressor Is Off

In some applications, the SmartPAC/RamPAC remains powered on when the air compressor that supplies the counterbalance and/or cushion is off—at night, for example. In this case, RamPAC will try all night to fill the counterbalance and/or cushion. To prevent this, you can stop RamPAC from trying to fill when the press is off. Make the following connections:

Connect a "press motor on" contact in series with the on RamPAC **TB3** pin **#377** (Ram Stop input).

Wiring RamPAC for Only Monitoring Shut Height

If you want to use RamPAC to monitor shut height but not to control shut height adjustment, make the following modifications in the wiring. This will cause RamPAC to display the shut height and tell whether it is at the setpoint. You can also choose whether to have RamPAC prevent the press from running if the shut height is incorrect. Refer to wiring diagram Figure 2 at the back of the manual.

> **CAUTION**
>
> **RAM ADJUSTMENT WILL NOT STOP WHEN YOU HIT E-STOP BUTTONS**
>
> Connect RamPAC **TB4** pins **# 385** and **# 386** into the E-stop circuit. If you do not do this, RamPAC will not stop the ram adjustment motion when you press an emergency stop button.
>
> **Failure to comply with these instructions could result in property damage.**

1. Connect Shut Height Monitor switch: Wire a switch between RamPAC **TB3** Pin **#373** (INPUT 5) and ground (RamPAC **TB3** Pin **#368)**, as shown.
   - When this switch is *open*, RamPAC displays the shut height and tells whether it is at the setpoint.
   - When this switch is *closed*, RamPAC prevents the press from running if the shut height is incorrect, in addition to displaying the shut height and telling whether it is at the setpoint.
2. Add a wire to connect RamPAC **TB3** Pin **# 375** (Ram Interrupt) to RamPAC **TB3** Pin **#368** (ground).
3. Connect Ram Stop Input; wire according to one of the following options:
   - To make RamPAC stop the ram adjustment motion whenever an E-stop occurs, wire RamPAC **TB3** Pin **#377** (Ram Stop) to WPC Pin # 57.

   Or

   - To let ram adjust operate independently of the E-stop circuit, wire RamPAC **TB3** Pin **#377** (Ram Stop) to RamPAC **TB3** pin **#367** (+12V).
4. Make sure the zero cam is connected properly, RamPAC **TB3** Pin **#376** (RamPAC Zero Cam) to SmartPAC **TB101** Pin **#211** (SmartPAC Zero Cam).
5. Make sure the input check circuit is wired as follows:
6. RamPAC **TB4** Pin **#383** (A) to SmartPAC **TB101** Pin **#205**(A)
7. RamPAC **TB4** Pin **#384** (B) to SmartPAC **TB101** Pin **#206** (B)

With these connections made, the RamPAC works as a read-only device. Automatic Shut Height Adjust mode will not work.

Wiring RamPAC for Counterbalance Control Only

If you want to use RamPAC to control only the counterbalance pressure, make the following modifications in the wiring. Refer to wiring diagram Figure 3 at the back of the manual.

1. Add a wire to connect Ram Stop (RamPAC **TB3** Pin #377) to +12VDC (RamPAC **TB3** Pin #367).

2. Add a wire to connect Ram Adjust Interrupt (RamPAC **TB3** Pin #376) to ground (RamPAC **TB3** Pin # 368).

Connecting Power to RamPAC

NOTICE

These connections will be 115 or 230VAC. Run them alone in a conduit or with other high-voltage wires. Do not run these wires with low-voltage cables. Use 16 gauge or larger wire for these connections.

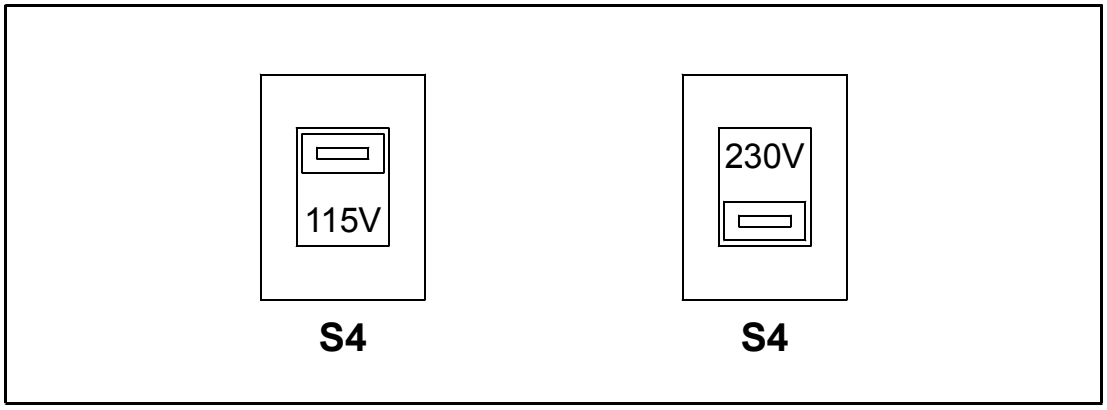


Figure 2-29. Switch S4 Selects 115 or 230V Input Power

1. Locate S4 on the RamPAC board (see figure on page 36). Be sure this switch is configured for the proper supply voltage, either 115 or 230 VAC.
2. Locate connector **TB4** on the RamPAC board.
3. Connect 115 or 230 VAC to RamPAC **TB4** pin **#379**, "HI" (L1)
4. Connect neutral to RamPAC **TB4** pin **#380**, "NEU" (L2)
5. Connect ground to RamPAC **TB4** pin **#381**, "GND."
6. Make the following connection, if necessary:
   - If you purchased RamPAC with its own enclosure, RamPAC **TB4** pin **#382** should come with a pre-installed ground wire connected to the enclosure.
   - If you are installing RamPAC in a console, ground RamPAC **TB4** pin **#382** to the console or the panel the board is mounted on. If there is paint where you connect it, scrape the paint off to expose bare metal.

Checking RamPAC Wiring

> **CAUTION**
>
> **INCORRECT INSTALLATION**
>
> Check the wiring after all installation and wiring connections are complete and before continuing with RamPAC setup.
>
> **Failure to comply with these instructions could result in property damage.**

1. Apply power to RamPAC and SmartPAC.
2. Check SmartPAC's display at startup. It will display the installed options. RamPAC should show up on that list. If it does not, turn the power off and do the following:
   a. Check communications wiring between RamPAC and SmartPAC (See Table 2-4).
   b. Check that power is connected to **TB104** on RamPAC.
3. Power up again. If SmartPAC still does not show RamPAC on the list, check the firmware versions of SmartPAC and RamPAC, as follows:
   a. Make a note of the SmartPAC firmware version on the Installed Options list in initialization mode or the label on U301 on the SmartPAC board. (Refer to your SmartPAC manual.)
   b. Make a note of the RamPAC firmware version on the firmware chip, U3 on the RamPAC board. (Refer to the figure on page 36.)
   c. Call Wintriss Tech Support to find out if these firmware versions are compatible.

> **NOTICE**
>
> **IF PRESS DOES NOT RUN AFTER RAMPAC INSTALLATION**
>
> Check that the following connections are wired correctly according to the wiring diagrams at the back of the manual:
>
> - RamPAC **TB3** pin **#375** (Ram Interrupt, Input 7)
> - RamPAC **TB3** pin **#377** (Ram Stop, Input 9)

4. When you have RamPAC and SmartPAC operating correctly, make sure there is no tooling or material in the press and run in it continuous mode for two minutes to ensure that the installation is wired properly.

Chapter 3 – RamPAC Setup

This chapter describes how to use the displays in SmartPAC with RamPAC's Initialization mode. It covers initialization of the shut height, counterbalance, and cushion systems.

Creating a "Test" Tool for RamPAC Testing

⚠ WARNING

COUNTERBALANCE FAILURE

- Warn all personnel to stand clear when you load a tool number.
- Perform this operation with care. Presses not normally run with high counterbalance air pressure may experience catastrophic failure.

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

CAUTION

DIE DAMAGE DURING TESTING

DO NOT load a physical die while you are setting up and testing RamPAC. Only load the tool number information in your SmartPAC.

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

NOTICE

RECORD PRESS AND TOOL SETTINGS ON SETUP SHEETS AT BACK OF MANUAL

You will need to re-enter press and tool parameters when you upgrade the RamPAC firmware.

NOTICE

SELECT = HIGHLIGHT + ENTER

When this manual says SELECT, it means highlight the item and press ENTER.

1. Go to SmartPAC's PROG mode (see your SmartPAC manual).
2. Select an existing tool number to use in setting up RamPAC or create a "test tool."
   - *If you use an existing tool number*

     Select a tool that has a shut height about half-way between the highest and lowest shut height your press can be adjusted to.

- *If you create a test tool*

  Create a new tool, and under the SHUT HEIGHT/COUNTERBALANCE, give this tool a shut height of half way between the upper and lower limits (if your press's shut height can be adjusted from 12" to 20", make the setpoint for this tool 16"), and an upper die weight of about half of the maximum upper die weight specified by the press's manufacturer. Set the Counterbalance mode to MANUAL Once these parameters have been entered, load this tool number. This tool will be used to test operation of the RamPAC.

NOTICE

When you press ENTER to load the tool number, you may hear air dumping from or filling the counterbalance and/or cushion control. This is normal and happens when the pressure setting for the new tool is different from the pressure for the previously loaded tool.

3. Turn the stroke selector keyswitch to Inch mode, turn the PROG/RUN key to RUN and inch the press to 0° (TDC).

Making Settings in Initialization

Entering Initialization Mode

If the keyswitch on SmartPAC's front panel is in the RUN mode, turn it to PROGRAM. If nothing happens, press the RESET button repeatedly until you see this screen:

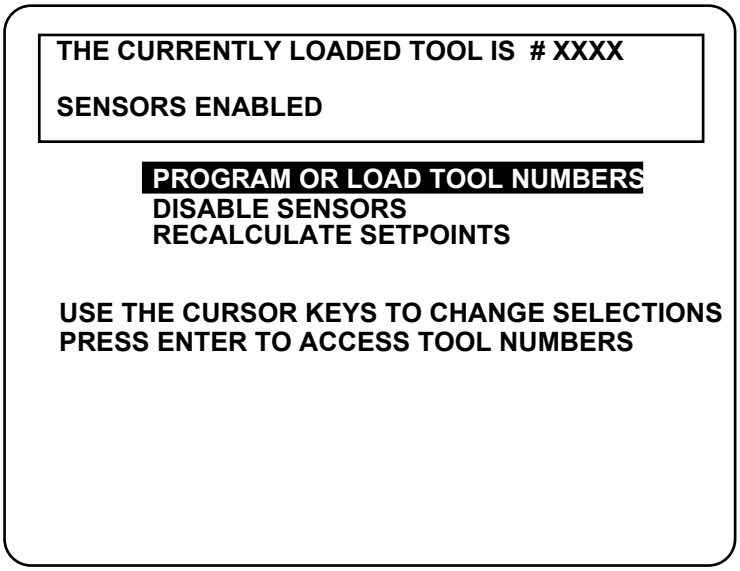


Figure 3-1. Main Program Menu

While this screen is displayed, press both the **"1"** and **"CLEAR"** keys simultaneously for one second. A screen similar to the following appears:

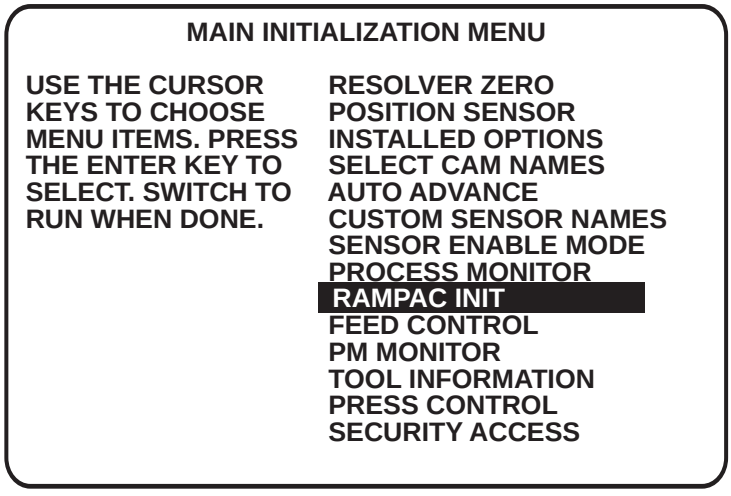


Figure 3-2. Main Initialization Menu

NOTICE

Depending on the configuration of your SmartPAC, the above screen may look different.

The figure above shows the SmartPAC Initialization menu. Using the cursor keys on your SmartPAC, select RAMPAC INIT. You will see this screen:

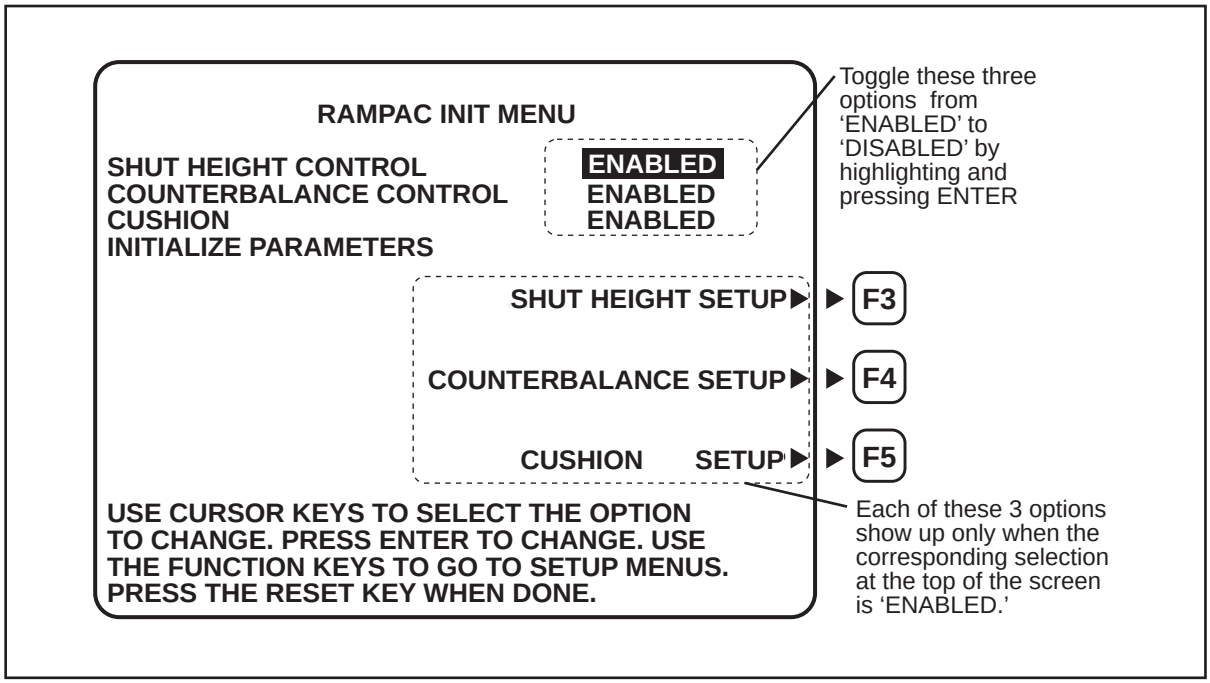


Figure 3-3. RamPAC Main Initialization Menu

Initialize Parameters

[MAIN INITIALIZATION – RAMPAC INIT]

Before you begin to set up RamPAC, you need to initialize the parameters. This deletes any existing settings, preparing RamPAC for the entries you are about to make.

NOTICE

INITIALIZE PARAMETERS ONLY WHEN YOU FIRST SET UP RAMPAC

The only time you should initialize parameters is when you first set up RamPAC. If you initialize RamPAC parameters after you have entered any RamPAC settings, they will be deleted.

To initialize RamPAC parameters:

1. In the RamPAC Init Menu, above, select INITIALIZE PARAMETERS. The following warning appears.

IF YOU CONTINUE THIS WILL INITIALIZE THE RAMPAC UPPER AND LOWER LIMITS, THE COUNTERBALANCE PRESSURES, DIE WEIGHTS AND TIMING AND CUSHION PRESSURE PARAMETERS. PRESS ENTER TO CONTINUE. PRESS RESET TO CANCEL.

Figure 3-4. Initialize Parameters Warning

2. When you first set up RamPAC and want to initialize parameters, press ENTER. If you do not want to initialize RamPAC parameters, press RESET.

NOTICE

STOP ADVANCE VALUE REQUIRED

Be sure to enter a Stop Advance value in the Shut Height Init menu after you initialize parameters. See "Entering a Value for Stop Advance," page 66, and "Setting Stop Advance," page 90.

Enabling RamPAC Features

[MAIN INITIALIZATION– RAMPAC INIT]

Make sure the RamPAC features you want to use are enabled and the ones you do not want to use are disabled. In the RamPAC Initialization menu (see page 60), enable or disable Shut Height Control, Counterbalance Control and/or Cushion Control as follows.

- To enable a disabled feature, use the cursor keys to highlight DISABLED. Press ENTER.
- To disable an enabled feature, use the cursor keys to highlight ENABLED. Press ENTER.

NOTICE

- All transducers and other components for a feature must be installed for that feature to work.
- If you sometimes run tools using the cushion air (or other pressure) controlled by RamPAC, enable cushion control. When you run a tool that does not use the cushion control, set the cushion operating mode to MANUAL (see page 84) and set the regulator on the cushion valve package to 0 (zero).

Shut Height Initialization Menu

[MAIN INITIALIZATION – RAMPAC INIT – **F3** (SHUT HEIGHT SETUP)]

> **NOTICE**
>
> **STOP ADVANCE VALUE REQUIRED FOR AUTOMATIC SHUT HEIGHT ADJUSTMENT**
>
> Because the ram does not stop moving instantaneously when the ram adjust motor is shut off, you may have to adjust the Stop Advance to allow for this. RamPAC's factory setting for stop advance is 0.000 (zero) inches. Enter an initial value of 0.010 inches. See "Entering a Value for Stop Advance," page 66 and "Setting Stop Advance," page 90.

To enter the Shut Height Initialization menu:

From the RamPAC Initialization menu (Figure 3-3), press F3 to select SHUT HEIGHT SETUP. The screen looks like this:

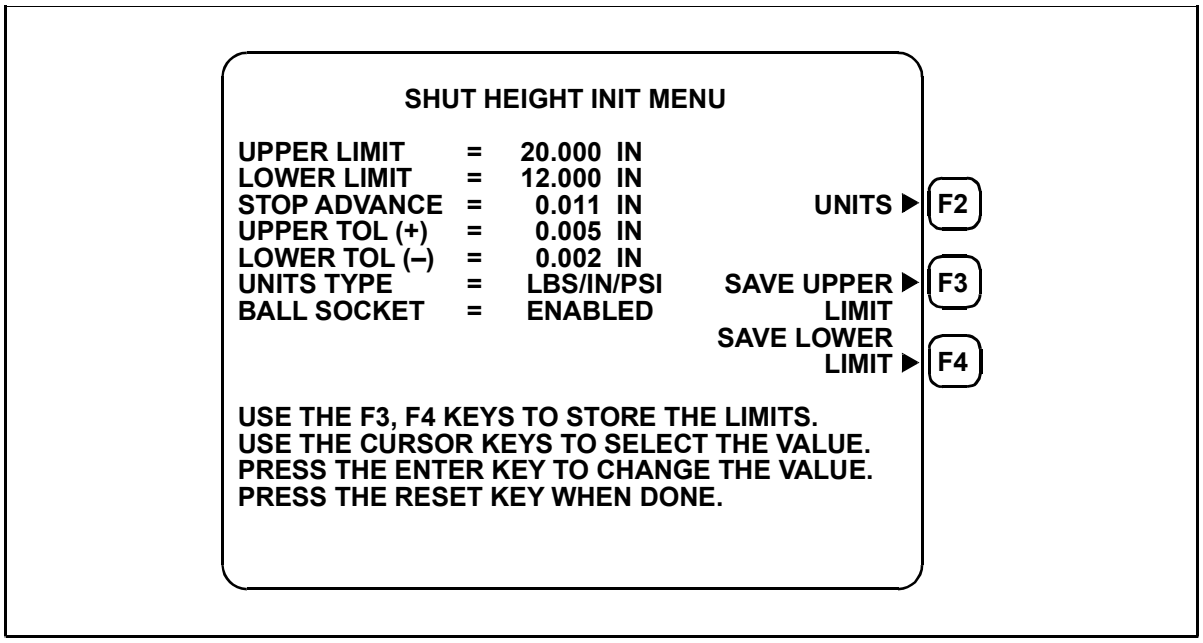


Figure 3-5. Shut Height Initialization Screen

Select Units

[MAIN INITIALIZATION – RAMPAC INIT – **F3** (SHUT HEIGHT SETUP)]

> **NOTICE**
>
> Select units before you set any RamPAC parameters. RamPAC does not convert from one system of units to another. If you change units after you have entered values for any parameters, the values will be wrong.

Before you set any values, select the system of measurement units you want to use. You can select from three systems of units, as shown in the table below. To change from one set of units to another, press F2 (UNITS) in the Shut Height Initialization menu.

Table 3-1. Units

Units type	Units
LBS/IN/PSI	pounds, inches, pounds per square inch
Kg/MM/BAR	kilograms, millimeters, bar
Kg/MM/Kp	kilograms, millimeters, kilopascals

> **NOTICE**
>
> This manual uses the LBS/IN/PSI system: pounds / inches / pounds per square inch

> **NOTICE**
>
> The example used in this chapter assumes the maximum shut height opening is 20.000” and the minimum opening is 12.000”.
>
> **Be sure to enter your press’s upper and lower limits in place of these values throughout this chapter.**

Saving Upper and Lower Shut Height Limits

[MAIN INITIALIZATION – RAMPAC INIT – **F3** (SHUT HEIGHT SETUP)]

Entering Upper and Lower Shut Height Limits

1. In the Shut Height Initialization menu, use the cursor keys to highlight UPPER LIMIT. Press enter and input the maximum shut height for the press, 20.000" in our example.
2. Do the same thing for the LOWER LIMIT, entering the least distance the shut height can be opened, 12.000" in our example. The shut height initialization screen looks like this:

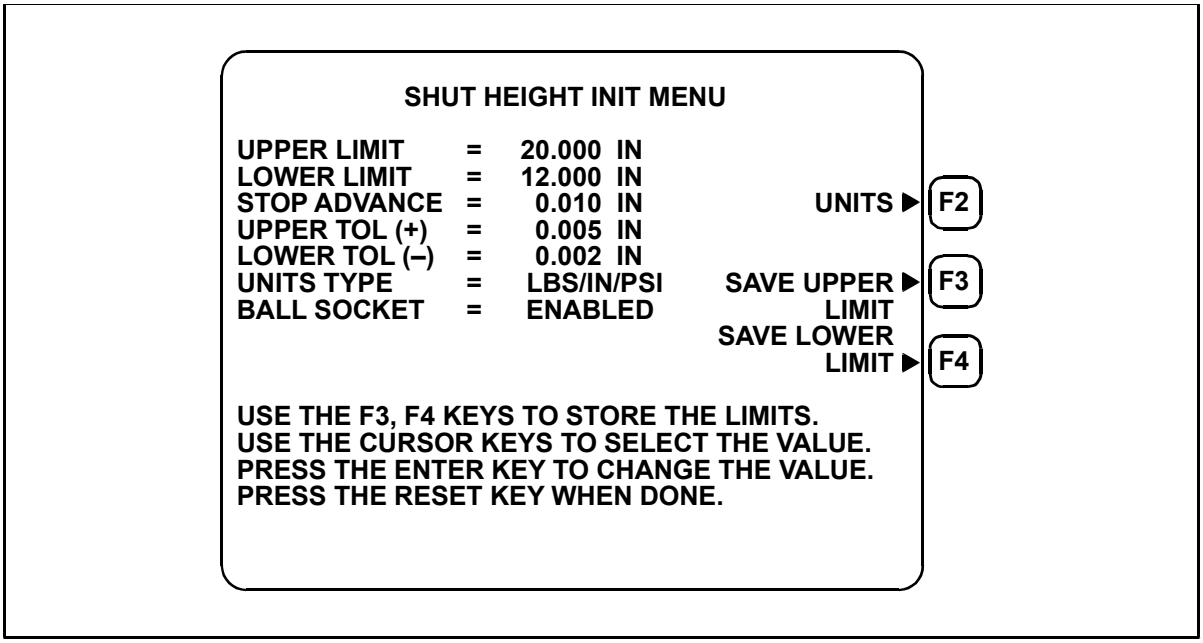


Figure 3-6. Shut Height Initialization Screen

Saving the Upper Shut Height Limit

1. In the Shut Height Init menu screen, press the **F3** button to select SAVE UPPER LIMIT. The following screen appears.

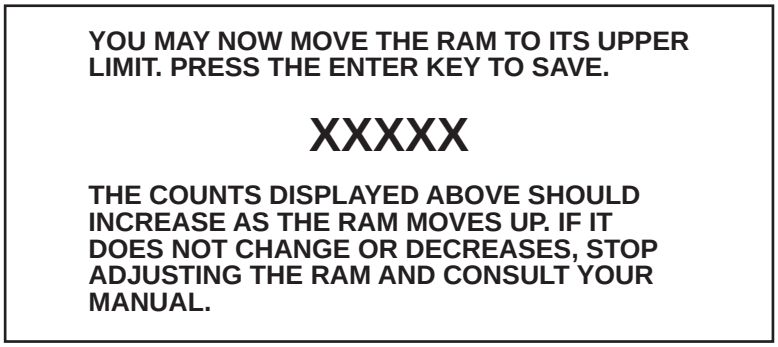


Figure 3-7. Save Upper Limit Display

Note: The counts shown are used by the RamPAC electronics and do not represent any physical measurement or quantity

2. Make sure the RAM MODE keyswitch is in MANUAL.
3. Using the RAM ADJUST switch or button (whichever you have), adjust the ram to its upper limit. As the ram moves, the counts shown in the display above should *increase.*

> **CAUTION**
>
> **EXCEEDING UPPER LIMIT OF SHUT HEIGHT**
>
> DO NOT exceed the upper limit of the shut height.
>
> **Failure to comply with these instructions could result in property damage.**

> **NOTICE**
>
> If the counts shown in the above dialog box do not increase as the ram moves up, stop moving the ram and consult the wiring diagrams at the end of this book. Make sure your linear position transducer is wired properly before you continue. Also make sure the wiring is correct for the ram adjust switch(es).

4. When you have reached the upper limit of the shut height adjustment, use a dial indicator to measure the ram height.
   - If the ram height you measure is exactly the same as the setting you entered for UPPER LIMIT (20.000" in our example), press ENTER to save the UPPER LIMIT setting.
   - If your measurement of the ram height is not at the setting you entered for UPPER LIMIT, press RESET. Then change the UPPER LIMIT value to match the height you measured. (See "Entering Upper and Lower Shut Height Limits," page 64.)

Proceed to the next section to save the lower limit.

Saving the Lower Shut Height Limit

1. In the Shut Height Init menu screen, press the **F4** key to select SAVE LOWER LIMIT. This screen appears:

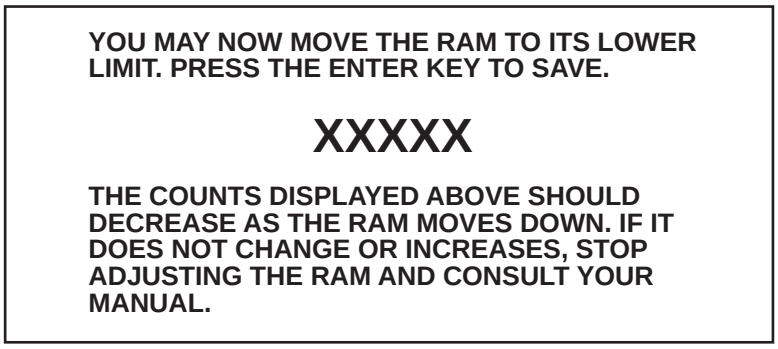


Figure 3-8. Save Lower Limit Display

2. Make sure the RAM MODE keyswitch is in MANUAL.
3. Using the RAM ADJUST switch or button, adjust the ram to its lower limit. As the ram moves, the counts shown in the display above should *decrease.*

CAUTION

EXCEEDING LOWER LIMIT OF SHUT HEIGHT

DO NOT exceed the lower limit of the shut height.

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

NOTICE

If the counts displayed in the above dialog box do not decrease as the ram moves down, stop moving the ram and consult the wiring diagrams at the end of this book. Make sure your linear position transducer is wired properly before you continue. Also make sure the wiring is correct for the ram adjust switch(es).

4. When the ram has reached the lower limit of the shut height adjustment, use a dial indicator to measure the ram height.
   - If the ram height you measure is exactly the same as the setting you entered for LOWER LIMIT (12.000" in our example), press ENTER to save the LOWER LIMIT setting.
   - If your measurement of the ram height is not at the setting you entered for LOWER LIMIT, press RESET. Then change the LOWER LIMIT value to match the height you measured. (See "Entering Upper and Lower Shut Height Limits," above.)

Entering a Value for Stop Advance

[MAIN INITIALIZATION – RAMPAC INIT – **F3** (SHUT HEIGHT SETUP)]

NOTICE

ENTER INITIAL STOP ADVANCE VALUE

Always enter a value for Stop Advance when you do any of the following:

Install a new RamPAC

Upgrade RamPAC firmware

Initialize parameters

- If you do not know what the Stop Advance should be, enter 0.010 inches. Later you can determine and enter the correct value (see "Setting Stop Advance," page 90).
- If you have already determined the correct Stop Advance for this press, enter that value.

  RamPAC stops the ram motor at the shut height, but the ram continues to move for a short while afterward. This can cause the ram to overshoot the shut height setpoint. The amount of overshoot is called "stopping distance." When you set Stop Advance, this makes the ram motor stop a short distance before the ram reaches the setpoint, allowing it to "coast" to the shut height setpoint.

1. In the Shut Height Initialization menu (page 62), use the cursor keys to highlight the value next to Stop Advance. Press ENTER.
2. In the entry window that appears, key in 0.010 as an initial value for Stop Advance. Press ENTER.

After you have completed setting up and checking out your RamPAC installation, determine the correct Stop Advance value for this press according to "Setting Stop Advance," page 90, and enter it in the Shut Height Init menu.

Setting Shut Height Tolerances

[MAIN INITIALIZATION – RAMPAC INIT – **F3** (SHUT HEIGHT SETUP)]

Determining Shut Height Tolerances

The tolerances on the shut height control how close to the setpoint the shut height must be in order for the press to run. The tolerances you select depend on how close to the setpoint you need the shut height to be when you change dies, and on other factors such as bearing clearance (see below).

> **CAUTION**
>
> **SHUT HEIGHT TOO LOW**
>
> Ensure that the negative (–) tolerance is small enough to prevent running the press with too low a shut height.
>
> **Failure to comply with these instructions could result in property damage.**

Bearing Clearance

If your press has a significant amount of play in the bearings, you may have to set the shut height tolerances to allow for this. (See "Measuring the Ram Bearing Clearance," page 122.)

Entering Shut Height Tolerances

You can set the acceptable tolerances on the shut height *for all tools* by following the instructions below. The factory settings for tolerances are +0.005" and –0.002". (See example, below.)

1. In the Shut Height Initialization menu (page 62), use the cursor keys to highlight UPPER TOL (+). Press ENTER. Key in the upper tolerance for the shut height
2. Do the same thing for the LOWER TOL (–), keying in the lower tolerance for the shut height.

> **NOTICE**
>
> The tolerances you set in INIT mode apply to the shut height of every tool you load on this press.

Example:

For a 6.000" shut height setting with the default tolerances of +0.005" and –0.002", the press will run when RamPAC senses that shut height is between 5.998" and 6.005".

Enabling Ball Socket Mode

[MAIN INITIALIZATION – RAMPAC INIT – **F3** (SHUT HEIGHT SETUP)]

On a press with a ball-socket connection, the shut height reading is accurate only at TDC and BDC (top dead center or bottom dead center). If you enable the Ball Socket feature, the shut height adjust relays turn on only when the crank angle is within 10^{o} of TDC or BDC, so the shut height will adjust only when the crank is in one of those positions. (See figure on page 25.) Enable the Ball Socket feature if you have a ball socket press. If you want, you may also choose to enable this feature for a press with a wrist-pin connection.

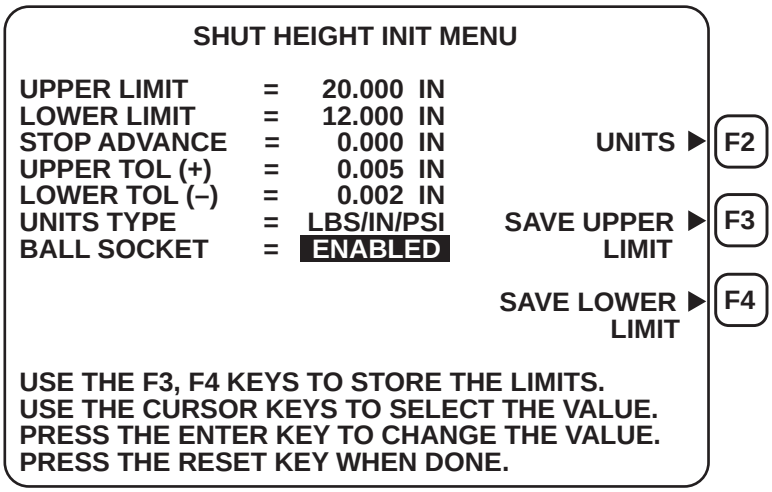


Figure 3-9. Enabling Ball Socket Mode

1. Enter the Shut Height Initialization menu.
2. Highlight the Ball Socket setting. Press ENTER to toggle between DISABLED and ENABLED.
3. Press RESET when done.

Checking the Automatic Shut Height Adjustment

[RUN MODE – SHUTGHT/CNTRBAL]

> ⚠ **WARNING**
>
> **COUNTERBALANCE OR CUSHION FAILURE**
>
> - Warn all personnel to stand clear when you load a tool number.
> - Perform this operation with care. Presses not normally run with high counterbalance or cushion air pressure may experience catastrophic failure.
>
> **Failure to comply with these instructions could result in death or serious injury.**

> **CAUTION**
>
> **DIE DAMAGE DURING TESTING**
>
> DO NOT load a physical die while you are setting up and testing RamPAC. Only load the tool number information in your SmartPAC.
>
> **Failure to comply with these instructions could result in property damage.**

> **NOTICE**
>
> - You must enter a value for Stop Advance. See page 66.
> - When you press ENTER to load the tool number, you may hear air dumping from or filling the counterbalance and/or cushion control. This is normal and happens when the pressure setting for the new tool is different from the pressure for the previously loaded tool.

1. Enter Program mode by turning the PROG/RUN key to RUN, then back to PROG.
2. If you have not loaded the tool number for your "test tool" or another tool, do so now.
3. Turn the PROG/RUN key to RUN.
4. Select SHUTHGT/CNTRBAL. The following display appears.

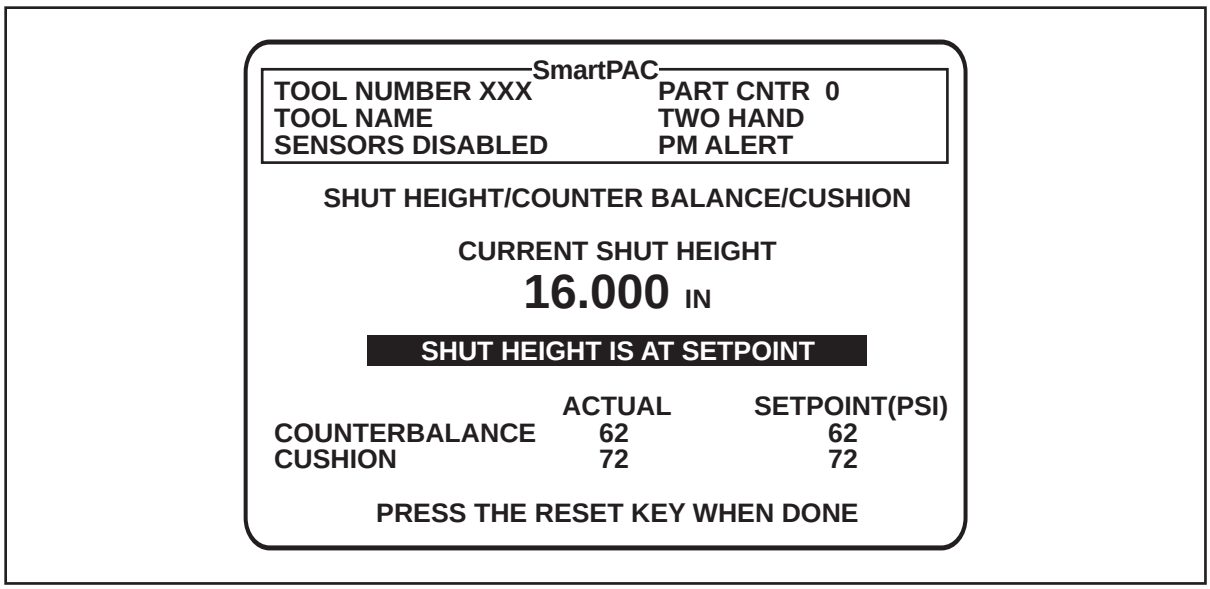


Figure 3-10. Run Screen for Shut Height/Counterbalance/Cushion

5. Switch the RAM MODE key switch to AUTO.

Checking Shut Height Adjustment

Turn the RAM ADJUST switch (or push the down button) to the down position momentarily. The ram should begin to move up. It will go up until it is above the setpoint and then reverse and go down to the setpoint. When it stops, the screen should display SHUT HEIGHT IS AT SETPOINT beneath the number that represents the current shut height. If it does, proceed to the new section. If it does not, check the wiring and then proceed as follows

- If the Shut Height at Setpoint message appears and then disappears, make a note of how far off of the setpoint the display says the ram is.
- If the ram "hunts" for the setpoint, repeatedly overshooting in both directions, this is because Stop Advance value is too small. In the Shut Height Init menu, increase the Stop Advance value. Refer to "Entering a Value for Stop Advance," page 66 and "Setting Stop Advance," page 90.
- If the ram stopped beyond the setpoint, you need to increase the Stop Advance parameter in the Shut Height Initialization menu. Go to "Setting Stop Advance" on page 90 and adjust the Stop Advance.

If you cannot get RamPAC to adjust the shut height correctly, call Wintriss Tech Support.

Checking Upper Shut Height Limit

> **CAUTION**
>
> **RAM EXCEEDS UPPER LIMIT**
>
> Watch to see that the ram stops at its upper limit. Be ready to hit the RAM INTERRUPT button immediately if the ram keeps going.
>
> **Failure to comply with these instructions could result in property damage.**

With the RAM MODE switch in the AUTO position, turn the RAM ADJUST switch to the UP position momentarily. This will start the ram moving up. It should move to its upper limit and then stop. If the ram does not stop at its upper limit, immediately press the RAM INTERRUPT button.

- If the ram stopped at its upper limit, proceed to the next section.
- If the ram did not stop at its upper limit, check the wiring of the ram control relays on RamPAC and the ram adjust switches. Then check to make sure you have the correct upper limit entered in Shut Height Initialization (see page 64).

Checking Lower Shut Height Limit

> **CAUTION**
>
> **RAM EXCEEDS LOWER LIMIT**
>
> Watch to see that the ram stops at its lower limit. Be ready to release the RAM ADJUST switch immediately if it keeps going.
>
> **Failure to comply with these instructions could result in property damage.**

With the RAM MODE switch in the MANUAL position, turn the RAM ADJUST switch to the DOWN/AUTO position and hold it there until the ram stops. If the ram is already at its lower limit, it will go up and then down. Either way, it should stop at the lower limit. If the ram does not stop at its lower limit, immediately release the RAM ADJUST switch.

- If the ram stopped at its lower limit, proceed to the next section.
- If the ram did not stop at its lower limit, check the wiring of the ram control relays on RamPAC and the ram adjust switch(es). Then check to make sure you have the correct lower limit entered in Shut Height Initialization (see page 64).

Setting Up the Counterbalance Control

[MAIN INITIALIZATION – RAMPAC INIT – **F4** (COUNTERBALANCE SETUP)]

> ⚠ **WARNING**
>
> **EXCEEDING MAXIMUM UPPER DIE WEIGHT**
>
> NEVER use a die in your press that exceeds
>
> - The manufacturer's recommended maximum upper die weight
>
> or
>
> - The maximum upper die weight that can be counterbalanced by your shop air pressure.
>
> **Failure to comply with these instructions could result in death or serious injury**

1. Return to the Main Initialization menu (see page 59).
2. Highlight RAMPAC INIT and press ENTER.
3. Be sure the COUNTERBALANCE CONTROL says ENABLED next to it.
4. Press **F4** to enter the Counterbalance Initialization menu. The following screen appears:

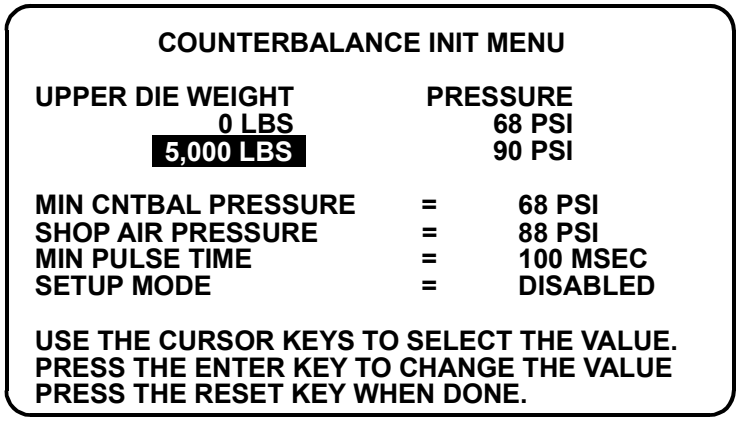


Figure 3-11. Counterbalance Initialization Menu

5. Locate the recommended counterbalance pressure legend on the side of the press. It should give you a number of different counterbalance pressures the manufacturer recommends for different upper die weights. The first entry should be for "0 lbs" upper die weight, or no upper die. Enter this number for the pressure for "0 lbs" in the Counterbalance Init menu. This is the air pressure needed to support the weight of the ram itself.

> ⚠ **WARNING**
>
> **ENTERING TOO-LARGE UPPER DIE WEIGHT FOR THE PRESS**
>
> - Enter the correct maximum upper die weight and pressure in the Counterbalance Init menu.
> - NEVER load a tool that exceeds the maximum upper die weight specified by the press manufacturer.
>
> **Failure to comply with these instructions could result in death or serious injury.**

6. On the same legend, locate the manufacturer-specified heaviest upper die weight and the pressure to counterbalance it. Enter this weight and pressure in the Counterbalance Init menu.

> **NOTICE**
>
> If your shop air pressure is not sufficient to balance the heaviest die weight listed on the legend, enter the highest weight your shop air can balance. RamPAC will not allow you to run a die that exceeds the weight that can be balanced by your shop air. See "Example: Limiting Upper Die Weight to Manufacturer's Recommended Maximum."

7. The air pressure required for the lightest upper die run in the press is the minimum you should run your counterbalance with. Enter this pressure as the MIN COUNTERBALANCE PRESSURE.

8. In the next line, SHOP AIR PRESSURE, enter the value you set on the counterbalance valve package regulator. Honeywell recommends the lesser of:

   20 PSI + (pressure required to balance the heaviest die you intend to run on the press)

   or

   Actual shop air pressure

Example: Entering Value for Shop Air Pressure

Your actual shop air pressure is 90 PSI.

Pressure required to balance the heaviest die you will run = 68 PSI

Calculate "SHOP AIR PRESSURE" (the value you set on the counterbalance valve package regulator, see page 28)

SHOP AIR PRESSURE = 20 PSI + (pressure to balance heaviest die you'll run)
= 20 PSI + 68 PSI = 88 PSI

The "SHOP AIR PRESSURE" you calculated is less than the actual pressure, so enter it (88 PSI) in the Counterbalance Init menu for "SHOP AIR PRESSURE."

9. The pulse time tells RamPAC how long it should pulse the counterbalance solenoid to change the counterbalance air pressure. 100 msec is a good place to start. If you notice that it takes a long time to change just a few PSI, you may want to increase the pulse time. If your press is 150 tons or greater, you may want to change it to 500 msec right away. The maximum pulse time is 999 msec.

> **NOTICE**
>
> **RAMPAC LIMITS UPPER DIE WEIGHT TO THE MANUFACTURER'S SPECIFIED MAXIMUM AND/OR THE MAXIMUM THAT CAN BE COUNTERBALANCED BY THE SHOP AIR PRESSURE**
>
> Once you enter the maximum upper die weight for this press, RamPAC will not let you program a higher upper die weight for any tool you load on this press.
>
> RamPAC also calculates the highest upper die weight that can be counterbalanced by your shop air pressure, and limits the upper die weight to that value.

Example: RamPAC Limiting Upper Die Weight to Manufacturer's Recommended Maximum

The manufacturer of your press recommends a maximum upper die weight of 5,000 pounds. You enter that value in the Counterbalance Init screen.

When you program a tool, if you try to enter 5,500 lbs for upper die weight, RamPAC will not accept this value and will show only 5,000 lbs, the maximum that you entered in Counterbalance Init.

Example: RamPAC Limiting Upper Die Weight According to Shop Air Pressure

Your press manufacturer recommends a maximum upper die weight of 5,000 pounds, and specifies that the counterbalance pressure for that weight should be 90 PSI. You enter those values in the Counterbalance Init screen.

Your shop air pressure is 88 PSI. Enter that value for SHOP AIR PRESSURE.

Your shop air pressure, 88 PSI, is only enough pressure to counterbalance an upper die weight of 4,545 lbs in this example. RamPAC will not allow you to program a tool with an upper die weight more than 4545 lbs, the maximum your shop air pressure can counterbalance.

Setting Up Setup Mode

[MAIN INITIALIZATION MENU – RAMPAC INIT – **F4** (COUNTERBALANCE SETUP)]

> **NOTICE**
>
> Setup mode is available only if you have a SmartPAC control with WPC integration or if you have connected the INCH/SETUP input (pin 249) to your stroke selector keyswitch.

To have RamPAC reduce the counterbalance pressure to the empty-die pressure during a tool change, use Setup mode. First, you enable Setup mode in the Counterbalance Initialization mode, then in Program or Run mode you put the press in inch mode. Then, when you load a new tool number, RamPAC automatically dumps air from the counterbalance to reduce the pressure to its no-upper-die value. When you set the press to single stroke or continuous, RamPAC fills the counterbalance to the correct pressure for the tool you loaded.

To set up the Setup mode feature, follow the instructions below. To change a die with Setup mode enabled, see page 83.

> **NOTICE**
>
> Setup mode operates only when the press is in inch mode and you have just loaded a new tool number in SmartPAC. To change a die using Setup mode, see page 83.

Enabling Setup Mode

1. In the RamPAC Init screen, press **F4** to select the Counterbalance Setup.
2. Use the arrow keys to highlight the entry next to SETUP MODE. Press ENTER to toggle the entry between DISABLED and ENABLED. When ENABLED shows, press RESET to return to RamPAC Initialization.

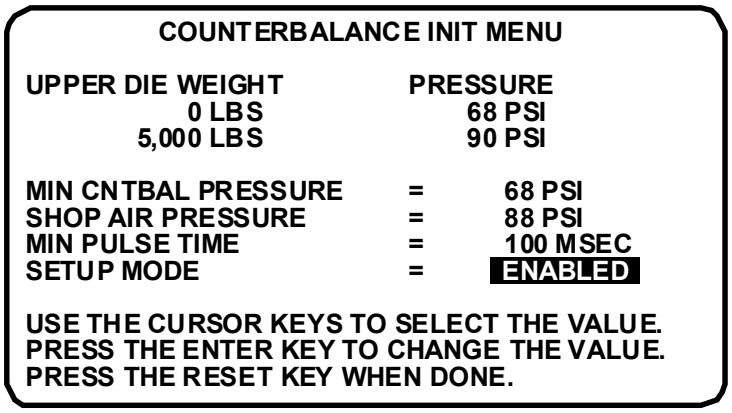


Figure 3-12. Enabling Setup Mode

Setting Up the Die Cushion Control

[MAIN INITIALIZATION MENU – RAMPAC INIT – **F5** (CUSHION SETUP)]

> **NOTICE**
>
> The second pressure control option is called "cushion control" in this manual. However, you can use it to control some other pressure instead, up to 150 PSI.

1. Go to the RamPAC Init menu.
2. Be sure that next to CUSHION CONTROL it says ENABLED.
3. Press the **F5** key to enter the Cushion Init menu. You will see the following screen:

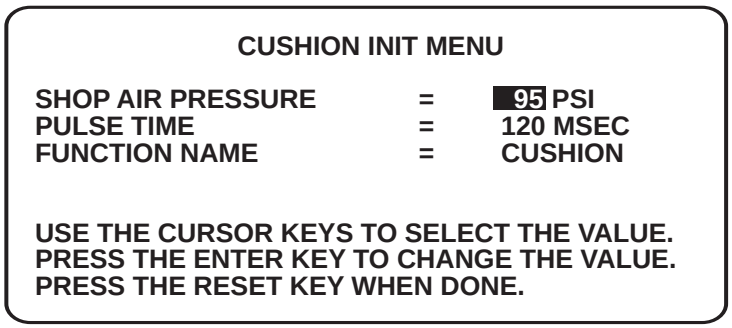


Figure 3-13. Cushion Control Initialization Menu

4. For SHOP AIR PRESSURE, enter the *larger* of:
   - The value you entered in the previous section ("Setting Up the Counterbalance Control")
     or
   - *20 PSI + (highest cushion pressure you intend to run on this press)*
5. The pulse time tells RamPAC how long it should pulse the cushion solenoid to change the cushion air pressure. 100 msec is a good place to start. If you notice that it takes a long time to change just a few PSI, you may want to increase the pulse time. If your press is 150 tons or greater, you may want to change it to 500 msec right away. The maximum pulse time is 999 msec.

Entering a Custom Name for Cushion Control

If you use the "cushion control" to monitor and/or control a different pressure, you may want to enter a custom name for this function. To enter a new name, follow the instructions below.

1. In the Cushion Init menu, select the name next to FUNCTION NAME =.
2. A text entry screen appears. Use the cursor keys, ENTER key and numeric keys to enter a name for this pressure control function. You can use up to ten characters.
3. Press F6 when you have finished entering the name, or RESET to cancel. The screen returns to the Cushion Init menu.

Testing the Counterbalance and Cushion Setups

> **CAUTION**
>
> **INCORRECT INSTALLATION**
>
> - Check all wiring connections before proceeding.
> - Complete this counterbalance and cushion test before operating your press with RamPAC.
>
> **Failure to comply with these instructions could result in property damage.**

1. Press RESET until you see SmartPAC's Main Initialization menu.
2. Turn the PROG/RUN key to RUN and then back to PROG.
3. Select PROGRAM OR LOAD TOOL NUMBER.
4. Select your "test tool" or other tool you have programmed (see "Creating a "Test" Tool for RamPAC Testing," page 57).
5. Scroll to SHUTHGT/CNTRBAL and select it. You will see the following screen:

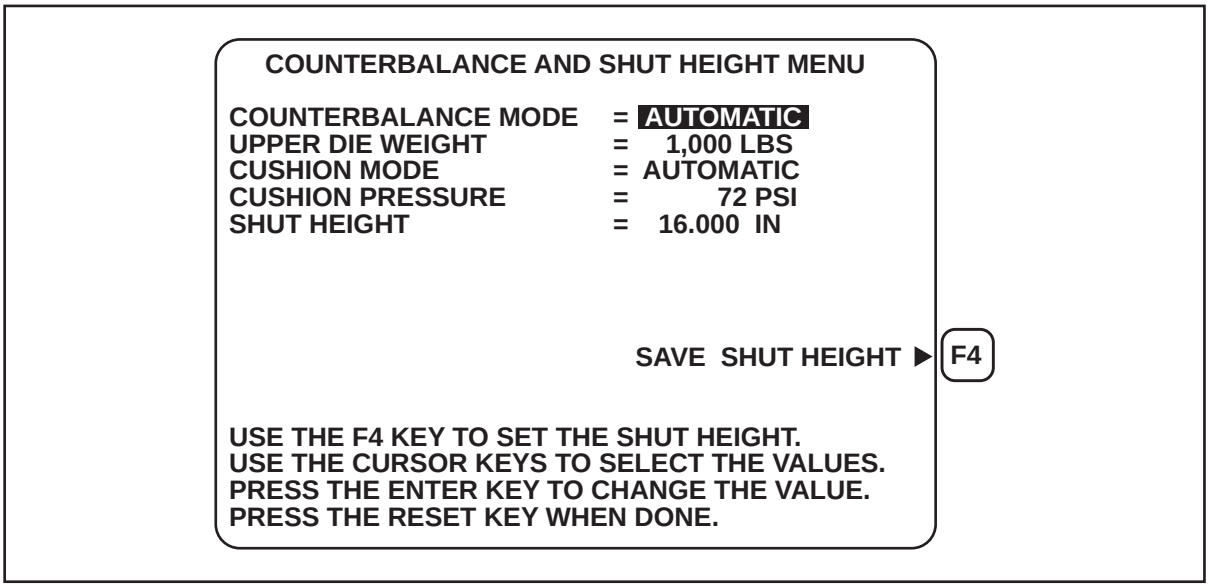


Figure 3-14. Shut Height/Counterbalance/Cushion Program Menu

6. Make sure the counterbalance is set to AUTOMATIC, not MANUAL. If it says MANUAL, highlight MANUAL and press ENTER to change to AUTOMATIC.

> **NOTICE**
>
> Counterbalance and cushion modes default to AUTOMATIC every time you load a tool number.

7. The values you see are the values you entered at the beginning of this chapter. We will leave the shut height at 16.000 inches.

8. Highlight the upper die weight. Press ENTER. You will see a dialog box appear that will allow you to change this number. Key in the highest die weight you intend to use on this press. Press ENTER.
9. For CUSHION PRESSURE, enter the highest cushion pressure you intend to use.

> **⚠ WARNING**
>
> **COUNTERBALANCE OR CUSHION FAILURE**
>
> - Warn all personnel to stand clear when you load a tool number.
> - Perform this operation with care. Presses not normally run with high counterbalance or cushion air pressure may experience catastrophic failure.
>
> **Failure to comply with these instructions could result in death or serious injury.**

> **CAUTION**
>
> **DIE DAMAGE DURING TESTING**
>
> DO NOT load a physical die while you are setting up and testing RamPAC. Only load the tool number information in your SmartPAC.
>
> **Failure to comply with these instructions could result in property damage.**

> **NOTICE**
>
> When you press ENTER to load the tool number, you may hear air dumping from or filling the counterbalance and/or cushion. This is normal and happens when the pressure setting for the new tool is different from the pressure for the previously loaded tool

10. Now press RESET to go back to the Main Programming menu for this tool. Select LOAD THIS TOOL. (Follow the instructions in your SmartPAC user manual.)
11. Turn the PROG/RUN key to RUN.
12. Select SHUTHGT/CNTRBAL.
13. Check that the counterbalance SETPOINT has a pressure reasonably close (within 2 to 3 PSI) to the pressure listed on the press for the upper die weight you entered.
14. Check that the counterbalance and cushion pressures are going up, getting closer to their setpoints. If one or both is not, check that the LED on the RamPAC board, right next to the corresponding counterbalance or cushion fill relay, is turning on and off (see figure on page 36). If it is not, contact Wintriss Tech Support.
15. If the above relay is working, check the cable connected to the fill valve on the valve assembly. There is a small LED on the back of the connector that will turn on when the valve is engaged. If this LED does not turn on, check your wiring between the valve and RamPAC.
16. Now return to the programming screen for this tool. Select SHUTHGT/CNTRBAL. Change the upper die weight of this tool to 0 PSI. Change the cushion pressure to the lowest cushion pressure you intend to use.
17. Load the tool again.

18. Turn the Prog/Run key to RUN (see your SmartPAC user manual). In Run mode, select SHUTGHT/CNTRBAL. Observe the counterbalance and cushion "Actual" pressures. They should be going down. If one or both is not, check that the LED on the RamPAC board right next to the corresponding counterbalance or cushion dump relay is turning on and off. If it is not, contact Wintriss Tech Support.
19. If the above relay is working, check the cable connected to the dump valve on the valve assembly. There is a small LED on the back of the connector that will turn on when the valve is engaged. If this LED does not turn on, check your wiring between the valve and RamPAC.
20. Make sure there is no tooling or material in the press and run the press in continuous mode for at least two minutes. If it runs properly, RamPAC is now ready to be used in your everyday operation of the press.

Chapter 4 – RamPAC Operation

This chapter explains how to make RamPAC settings for tools in SmartPAC's program mode and how to modify those settings. It also tells how to use RamPAC in Run mode. For information on programming another SmartPAC module, see that module's user manual.

For the purposes of this manual, it will be assumed that the RamPAC being used is configured to control shut height, and counterbalance and cushion pressures.

Shut Height Adjustment Operator Controls

The following is a list of what the different shut height operator controls will do and what the implications may be.

RAM MODE switch

The **RAM MODE** switch has three positions: **OFF, MANUAL,** and **AUTO.**

OFF disables the ram adjustment motor.

MANUAL enables you to adjust the shut height by turning the Ram Adjust switch to UP or DOWN. The press will not run with the Ram Mode in MANUAL.

AUTO enables RamPAC to automatically adjust the shut height to the setpoint when you load a tool number or turn the Ram Adjust switch momentarily to DOWN.

See the table below for more information.

RAM ADJUST switch

The **RAM ADJUST** switch is a momentary switch that returns to center, **OFF,** from either **DOWN/AUTO** or **UP.** It controls the movement of the ram. You may have buttons that control the up/down movement of your ram. In that case, OFF is the state when neither the up nor the down button is being pushed. The table below shows how the ram adjustment and the press react to different combinations of RAM MODE and RAM ADJUST switch settings.

Table 4-1. Ram Mode and Ram Adjust Switches Operation

Ram Adjust Switch Position	Ram Mode Switch Position		
	OFF	**MANUAL**	**AUTO**
OFF	Ram does not move. Press runs.	Ram does not move. Press does not run.	Ram does not move. Press runs if shut height is at setpoint*.
DOWN/AUTO	Ram does not move. Press runs.	Hold Ram Adjust switch in DOWN/AUTO position and ram moves down • until it reaches lower limit **OR** • until you release Ram Adjust switch. Press does not run.	Turn Ram Adjust switch momentarily to the DOWN/AUTO position. Ram moves to the setpoint: • If ram starts from above the setpoint, it moves down to the setpoint. • If ram starts from below the setpoint, it moves up above the setpoint and then moves down to the setpoint. Press runs only when the shut height is at setpoint*.
UP	Ram does not move. Press runs.	Ram moves until it reaches upper limit or until you release Ram Adjust switch. Press does not run.	Turn Ram Adjust switch momentarily to the UP position. Ram moves up and stops at upper limit. Press runs only when the shut height is at setpoint*.

* within the tolerances set in Initialization (page 67).

RAM INTERRUPT Button

Press this button to stop the ram while it is being adjusted.

Changing the Die with Setup Mode Enabled

When you enable Setup mode (see page 74) RamPAC reduces the counterbalance pressure to the empty-die pressure during a tool change. With Setup mode enabled, when you load a new tool number in SmartPAC, RamPAC automatically dumps air from the counterbalance to reduce the pressure to its empty-die value. When you set the press to single stroke or continuous, RamPAC fills the counterbalance to the correct pressure for the tool you loaded.

To change a die with setup mode enabled, follow a procedure similar to the following:

1. Put your press into Inch mode.
2. Inch the press down. Unclamp the upper die.
3. Load the new tool number on SmartPAC. RamPAC "dumps" air from the counterbalance until it reaches the zero-die-weight pressure.
4. Move the empty ram up.
5. Unclamp the lower die. Remove the old die set and bring in the new die set. Clamp the lower die.
6. Adjust shut height.
7. Inch ram down and clamp the new upper die.
8. Switch to single stroke or continuous, holding the switch in position for at least two seconds. RamPAC fills the counterbalance to the correct pressure for the tool's upper die weight and fills the cushion to the pressure you entered for this tool.
9. After switching to single stroke or continuous, you can go back to inch mode. The only time RamPAC dumps the counterbalance down to the to zero die weight pressure is when you are in inch mode and load a new tool number.

Making Initial Settings for a Tool

NOTICE

RECORD PRESS AND TOOL SETTINGS ON SETUP SHEETS AT BACK OF MANUAL

You will need to re-enter press and tool parameters when you upgrade the RamPAC firmware.

The following steps must be followed for each tool the FIRST time it is loaded after RamPAC is installed. After that, if you need to change settings for the tool, refer to "Modifying RamPAC Settings," page 89.

NOTICE

SELECT = HIGHLIGHT + ENTER

When this manual says SELECT, it means highlight the item and press ENTER.

Making Initial Counterbalance and Cushion Settings

[MAIN PROGRAMMING MENU – PROGRAM OR LOAD TOOL NUMBERS – (select tool number)]

NOTICE

The second pressure control option is called "cushion control" in this manual. However, you can use it to control some other pressure instead, up to 150 PSI.

1. From the SmartPAC's main programming menu, select PROGRAM OR LOAD TOOL NUMBERS.
2. From the list of tool numbers, select the tool that you wish to make RamPAC settings for.
3. Select SHUTHGT/CNTRBAL from the right side of the Main Programming for Tool # menu. The following display appears.

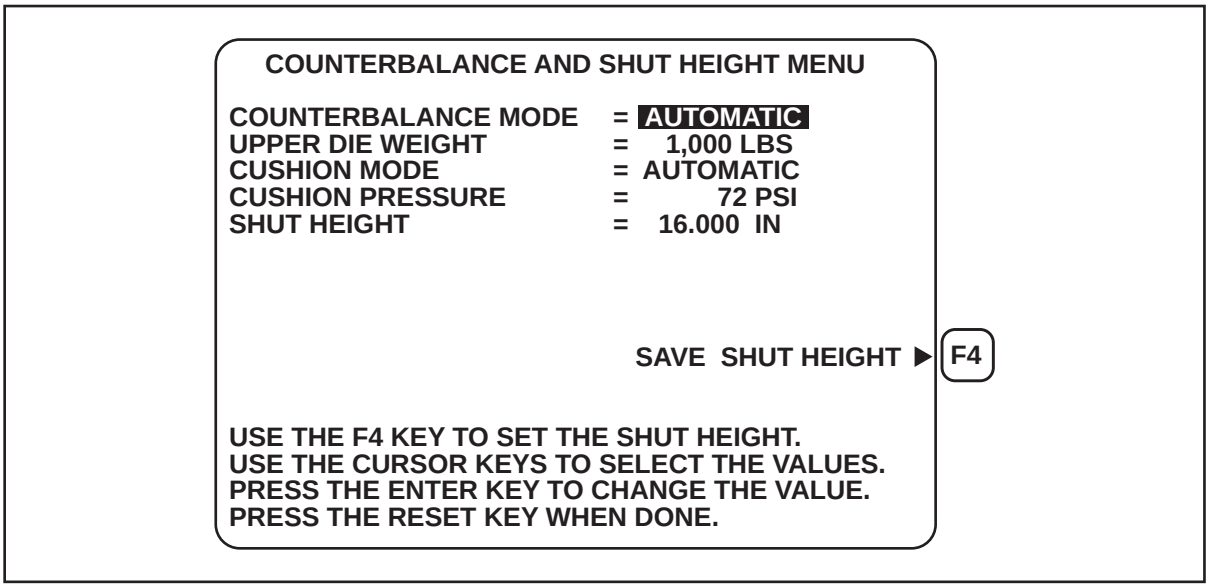


Figure 4-1. Counterbalance and Shut Height Program Menu

5. Be sure the Counterbalance Mode is set to AUTOMATIC. If it says MANUAL, highlight MANUAL and press ENTER.

> **NOTICE**
>
> - Counterbalance and cushion modes default to AUTOMATIC every time you load a tool number.
> - In AUTOMATIC, RamPAC automatically sets the air pressure to the value you set for this tool.
> - In MANUAL, RamPAC does not control the air pressure. You control the air pressure manually with the regulator on the valve package (page 28).

6. Enter the upper die weight of this tool. It should be stamped on the upper die per OSHA 1910.217 regulations.
7. Make the following settings, depending upon whether this tool uses cushion (or other pressure) control.
    - If this tool uses cushion air, be sure Cushion Mode is set to AUTOMATIC. If it says MANUAL, highlight MANUAL and press ENTER change to AUTOMATIC.
    - If Cushion Control is enabled (page 61) but this tool *does not use cushion air*, be sure Cushion Mode is set to MANUAL. If it says AUTOMATIC, highlight and press ENTER. Then set the manual regulator on the valve package to 0 (zero). See figure, page 28.
8. Press RESET to return to the Main Programming menu.

Continue to the next section to set the shut height for this tool.

Making Initial Shut Height Setting

[MAIN PROGRAMMING MENU – PROGRAM OR LOAD TOOL NUMBERS – (select tool number) – SHUTGHT/CNTRBAL]

⚠ WARNING

COUNTERBALANCE OR CUSHION FAILURE

- Warn all personnel to stand clear when you load a tool number.
- Perform this operation with care. Presses not normally run with high counterbalance or cushion air pressure may experience catastrophic failure.

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

CAUTION

DIE DAMAGE DURING TESTING

DO NOT load a physical die while you are setting up RamPAC. Only load the tool number information in your SmartPAC.

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

NOTICE

When you press ENTER to load the tool number, you may hear air dumping from or filling the counterbalance and/or cushion control. This is normal and happens when the pressure setting for the new tool is different from the pressure for the previously loaded tool

NOTICE

If the ram will not move when you try to adjust shut height, check to see if Ball Socket mode is enabled (see page 68) and proceed as follows, depending on the type of press you have:

- If yours is a *ball-socket press*, be sure that Ball Socket mode is enabled and that the crank angle is within ten degrees of top or bottom dead center (see page 68).
- If yours is a *wrist-pin press*, you can disable Ball Socket mode (page 68) or if you want to have Ball Mode enabled, make sure the crank angle is within ten degrees of top or bottom dead center.

1. In the Main Programming menu, on the left side of the screen, select LOAD THIS TOOL.
2. Switch the PROG/RUN keyswitch to RUN.
3. Using the method you used before installing RamPAC, adjust the shut height manually to the desired position.
4. Set up the tool the way you normally would.
5. Select SHUTHGT/CNTRBAL from the RUN menu. You will see this screen:

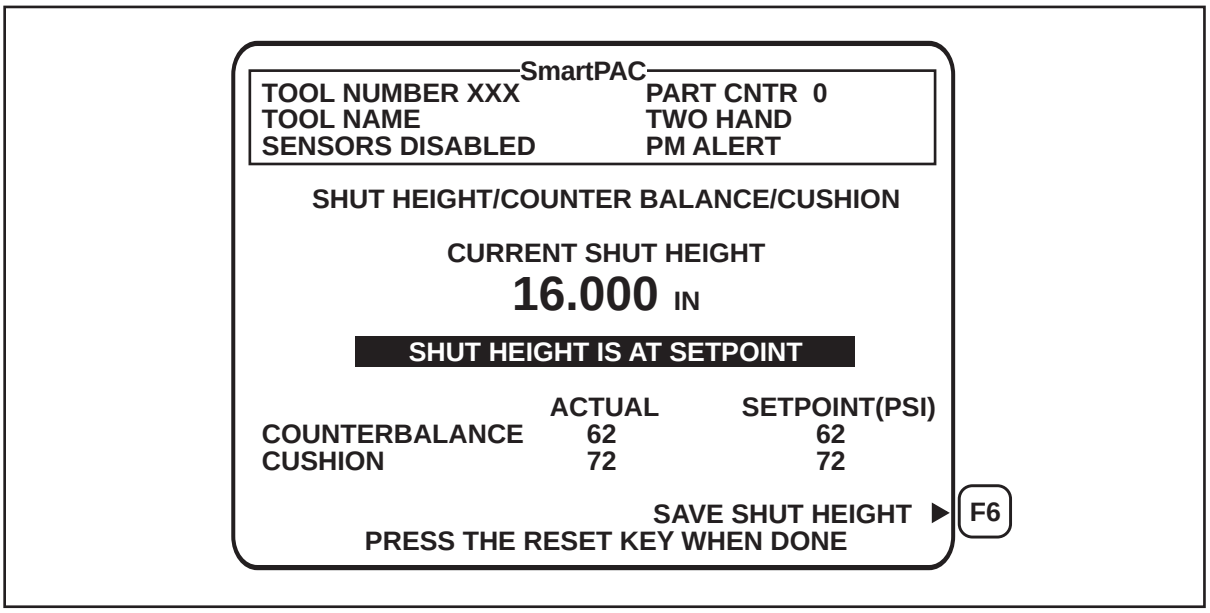


Figure 4-2. Shut Height/Counterbalance/Cushion RUN Menu

6. After verifying the setup, press **F6**. A dialog box will appear asking you if you want to save the current shut height setting as the setpoint for this tool.
   - If you want to save this as the new shut height, press ENTER. Then press RESET.
   - If you do *not* want to save this as the new shut height, press RESET.

   The Run menu appears.
7. Turn the RAM MODE switch to AUTO.
8. Now run the job as usual.

Loading a Tool with RamPAC Settings Already Made

[MAIN PROGRAMMING MENU – PROGRAM OR LOAD TOOL NUMBERS – (select tool number) – SHUTGHT/CNTRBAL]

When loading a tool that already has RamPAC settings (shut height setpoint, upper die weight, and cushion pressure), follow these steps:

1. In RUN or PROGRAM mode, select LOAD NEW TOOL. Select the tool you wish to load from the tool number listing.
2. Load that tool. Turn the PROG/RUN key to RUN if it is not already there.

> **NOTICE**
>
> When you press ENTER to load the tool number, you may hear air dumping from or filling the counterbalance and/or cushion control. This is normal and happens when the pressure setting for the new tool is different from the pressure for the previously loaded tool.

3. Make sure the press is at 0^{o} (TDC).
4. Select SHUTHGT/CNTRBAL.
5. Be sure the RAM MODE key switch is turned to AUTO.
6. Turn the RAM ADJUST switch to DOWN/AUTO momentarily. The ram will begin to move.
   - If the current shut height is below the setpoint, the ram will move up above the setpoint and then come back down to it.
   - If the ram is above the setpoint, it will simply move down to it.
7. Once the ram stops moving, the SHUTHGT/CNTRBAL screen should display SHUT HEIGHT IS AT SETPOINT right below the numbers representing the shut height in inches (or millimeters). If it does not, turn the RAM MODE switch to MANUAL and adjust the shut height to the setpoint.

You are now ready to run this job.

Modifying RamPAC Settings

[MAIN PROGRAMMING MENU – PROGRAM OR LOAD TOOL NUMBERS – (select tool number) – SHUTGHT/CNTRBAL]

You will at some time need to change settings for a tool.

For instance, if a die is sharpened, its shut height will change slightly. To change the shut height setting for a tool, you have two options:

- If you are sure what the new shut height should be, in PROG, change the shut height setpoint using the SmartPAC keypad. (See "Making Initial Settings for a Tool," page 84.)

or

- If you need to determine the new shut height, in RUN, set the RAM MODE selector switch to MANUAL and set up the shut height as you would for a new tool. When the ram is at the correct setting, press **F6** to save the new setpoint. (See "Making Initial Shut Height Setting," page 86.)

Change counterbalance or cushion settings as instructed in "Making Initial Settings for a Tool," page 84.

Loading a Heavier Upper Die

When you first installed and set up RamPAC, you entered a value for SHOP AIR PRESSURE that was 20 PSI greater than the counterbalance pressure for the heaviest die you intended to use. You also set the manual counterbalance regulator on the valve package to the same pressure, 20 PSI greater than the pressure for the heaviest die you intended to use.

> **⚠ WARNING**
>
> **AIR PRESSURE INSUFFICIENT TO COUNTERBALANCE DIE**
>
> DO NOT run the die on this press if the full pressure of your shop air is not enough to counterbalance the weight of an upper die. If you run too heavy an upper die on the press, the counterbalance cannot support the die and the stop time for the press would increase. This will affect the safety distance of your point-of-operation guarding devices, such as two-hand control(s) and light curtains.
>
> **Failure to comply with these instructions could result in death or serious injury.**

> **⚠ WARNING**
>
> **UPPER DIE WEIGHT EXCEEDS PRESS CAPACITY**
>
> DO NOT install a die on this press that exceeds the manufacturer's specified maximum upper die weight.
>
> **Failure to comply with these instructions could result in death or serious injury.**

To load a heavier die, that still is less than the manufacturer's specified maximum upper die weight, follow these instructions:

1. Enter the weight of this heavier upper die as instructed in "Making Initial Counterbalance and Cushion Settings," page 84. If the counterbalance pressure for this upper die weight is higher than the SHOP AIR PRESSURE, RamPAC will set the upper die weight to the weight that *can* be balanced by the SHOP AIR PRESSURE.
2. Increase the SHOP AIR PRESSURE value in Initialization mode (see "Setting Up the Counterbalance Control," page 72). Change the SHOP AIR PRESSURE value to 20 PSI greater than the counterbalance pressure for the new, heavier upper die you want to use, up to the full pressure of your shop air.
3. Set the manual counterbalance regulator on the valve package for this higher value.
4. Repeat Step 1, trying again to enter the new, heavier upper die weight.

Setting Stop Advance

If you are using automatic shut height adjustment, you should adjust the Stop Advance function.

During automatic shut height adjustment, RamPAC stops the ram motor at the shut height, but the ram continues to move for a short while afterward. This can cause the ram to overshoot the shut height setpoint. The amount of overshoot is called the "stopping

distance." When you set Stop Advance, this makes the ram motor stop a short distance before the ram reaches the setpoint, allowing it to "coast" to the shut height setpoint.

To determine the correct Stop Advance, you run a number of tests to find out what the stopping distance is. Then, using this information, you can set Stop Advance in the Shut Height Init menu. The factory setting for Stop Advance is 0.000" (zero inches).

Running Tests to Determine Stop Advance

Follow these instructions to find out how far the ram moves after the motor turns off. Use the table below to record the numbers. Also, refer to the example that follows.

1. Set Stop Advance to 0.000 (zero), as follows:

   Enter the Shut Height Initialization menu as described on page 62.

   - If Stop Advance is 0.000 (zero), press RESET twice to return to the Main Initialization menu.
   - If Stop Advance is not zero, highlight the Stop Advance value and press ENTER. In the screen that appears, enter 0.000 (zero) and press ENTER. Press RESET twice to return to the Main Initialization menu.
2. Turn the Program/run key to RUN and then back to PROG, to enter Programming mode.
3. Select PROGRAM OR LOAD TOOL NUMBERS.
4. Select a previously programmed tool number (or program a new one). **Write down the tool number.**
5. Select SHUTHGT/CNTRBAL so you can monitor the shut height during adjustment. **Write down the shut height shown on the screen.** Press RESET.

> **⚠ WARNING**
>
> **COUNTERBALANCE OR CUSHION FAILURE**
>
> - Warn all personnel to stand clear when you load a tool number.
> - Perform this operation with care. Presses not normally run with high counterbalance or cushion air pressure may experience catastrophic failure.
>
> **Failure to comply with these instructions could result in death or serious injury.**

> **CAUTION**
>
> **DIE DAMAGE DURING TESTING**
>
> DO NOT load a physical die while you are setting up RamPAC. Only load the tool number information in your SmartPAC.
>
> **Failure to comply with these instructions could result in property damage.**

> **NOTICE**
>
> When you press ENTER to load the tool number, you may hear air dumping from or filling the counterbalance and/or cushion control. This is normal and happens when the pressure setting for the new tool is different from the pressure for the previously loaded tool.

6. Select LOAD THIS TOOL. Press ENTER again to load the tool.

7. Turn the Program/run key to RUN.
8. Select SHUTHGT/CNTRBAL.
9. Make sure the Ram Mode Switch is set to AUTO.
10. Turn the Ram Adjust Switch momentarily to DOWN/AUTO. The ram adjusts to the shut height setting for the tool, approaching the shut height from above. When the ram stops moving, **write down the CURRENT SHUT HEIGHT shown on the display.** To find the stopping distance, subtract the CURRENT SHUT HEIGHT from the shut height setpoint.
11. Repeat this test several times by moving the ram away from the shut height setpoint in MANUAL mode, and then turning the Ram Adjust Switch momentarily to DOWN/AUTO. Each time you repeat the test, write down the CURRENT SHUT HEIGHT shown on the display.

> **NOTICE**
>
> If the ram "hunts" for the setpoint, repeatedly overshooting in both directions, enter a small value for Stop Advance, 0.005", for example, run the test again and note how far the ram overshoots shut height. Add this distance to the value you entered and test again. Repeat this procedure until the ram stops at the shut height setting. Then run the test at different shut heights, as described in step 12.

12. Repeat steps 2 through 11 for different tools with different shut heights, both low and high.

Table 4-2. Stopping Distance Test Measurements

Tool #	Shut height setpoint	"Current Shut Height" Test 1	stopping distance = setpoint – test 1	"Current Shut Height" Test 2	stopping distance = setpoint – test 2	"Current Shut Height" Test 3	stopping distance = setpoint – test 3

Use these measurements to calculate the Stop Advance as shown in "Calculating Stop Advance on the next page.

Example: Recording stopping distance test data

If the setpoint is 12.425" and the ram stops at 12.417" inches, the stopping distance is 12.425" – 12.417" = 0.008"

Table 4-3. Example of stopping distance measurements

Tool #	Shut height setpoint	Shut height test 1	stopping distance = setpoint – test 1	Shut height test 2	stopping distance = setpoint – test 2	Shut height test 3	stopping distance = setpoint – test 3
1	12.425	12.417	**0.008**	12.418	**0.007**	12.418	**0.007**
25	18.625	18.607	**0.018**	18.609	**0.016**	18.608	**0.017**
313	16.000	15.989	**0.011**	15.990	**0.010**	15.991	**0.009**

Calculating Stop Advance

- If the stopping distances are all the same, use the stopping distance measurement as the Stop Advance. For example, if all readings are 0.015”, the Stop Advance should be 0.015. Enter it as explained in “,” below.
- If the stopping distance varies, use the largest value as the stop advance value (see example, below).

CAUTION

SHUT HEIGHT AUTOMATIC ADJUSTMENT VARIES

Adjust the ram to the correct shut height manually if it is not correct after automatic adjustment. This may be necessary where the stopping distance varies too much for the Stop Advance to compensate.

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

Example: If Stopping Distance Varies

In the example shown in the table above, the largest stopping distance is 0.018”. Use this distance as the Stop Advance.

Entering and Testing a New Value for Stop Advance

CAUTION

SHUT HEIGHT AUTOMATIC ADJUSTMENT VARIES

Adjust the ram to the correct shut height manually if it is not correct after automatic adjustment. This may be necessary where the stopping distance varies too much for the Stop Advance to compensate.

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

1. Enter the Shut Height Init menu (see page 62).

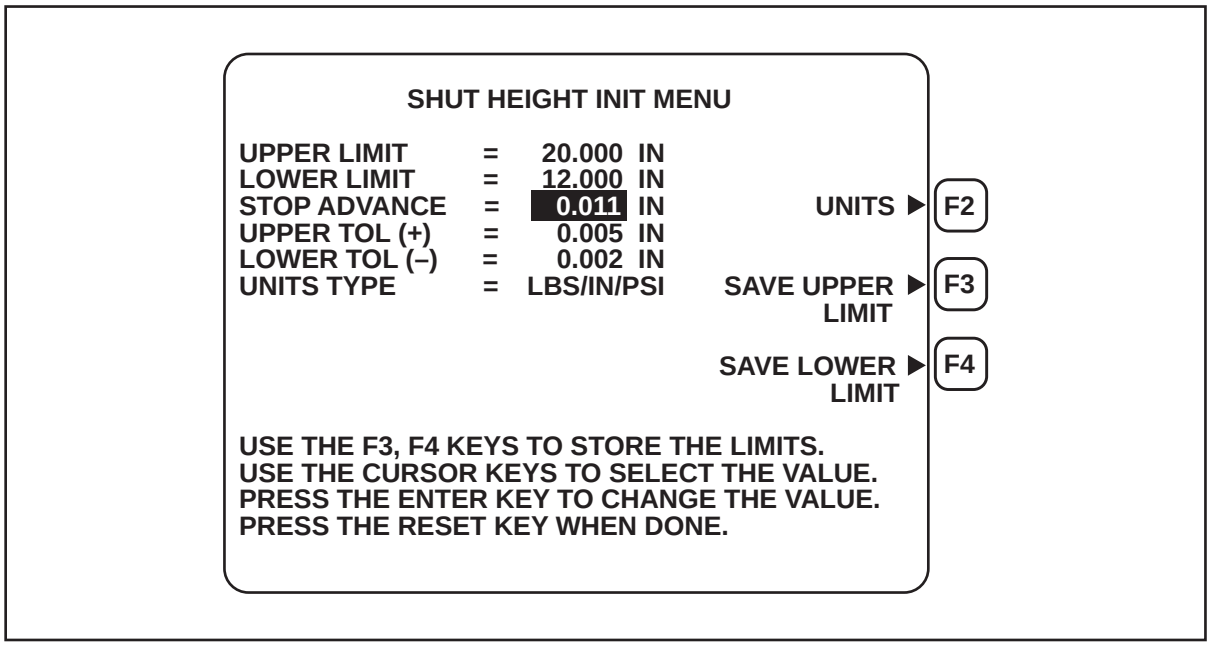


Figure 4-3. Setting Stop Advance

2. Highlight the Stop Advance value. Press ENTER.
3. Use the keypad to enter the new Stop Advance value. Press ENTER. Press RESET twice to return to the Main Initialization menu.
4. Turn the Program/Run key to RUN to enter Run mode. Select SHUTHGT/CNTRBAL.
5. Turn the Ram Mode switch to MANUAL. Move the ram in MANUAL MODE away from the setpoint so that SHUT HEIGHT IS AT SETPOINT is not displayed.
6. Turn the Ram Mode switch to AUTO.

NOTICE

If the ram is below the shut height when you turn the Ram Adjust switch to DOWN/AUTO, the ram will first move up until it is above the shut height, and then it will move down to the shut height setting.

7. Turn the Ram Adjust switch momentarily to DOWN/AUTO. The ram adjusts to the shut height setting for the tool, approaching the shut height from above.
8. Repeat steps 5 through 7 at different shut height setpoints (different tools) until you are satisfied with how close to the setpoint RamPAC stops the ram.

When you have adjusted Stop Advance, finish checking the upper and lower limit shut height settings, starting with "Checking Upper Shut Height Limit" on page 71.

Chapter 5 – Troubleshooting

This chapter gives instructions for diagnosing and solving RamPAC-related problems. Also refer to your SmartPAC manual and other product documentation.

For the purposes of this manual, it will be assumed that the RamPAC being used is configured with shut height control, counterbalance control, and cushion control.

NOTICE

FOR BEST OPERATION OF RAMPAC

Since RamPAC measures and displays the shut height and the counterbalance and cushion pressures, pre-existing problems with these parts of the press will become more obvious after you install RamPAC. For best performance, your press should be in good condition and properly maintained, especially with regard to the following:

- The ram should move smoothly up and down, not sticking at any point in its travel, with gibs well maintained and lubricated.
- The ram adjust motor and the electric power source should be sufficient for the needs of the press.
- The counterbalance and cushion systems, piping and fittings should not leak excessively.
- Drain surge tanks regularly to remove water and contamination buildup.
- Check filter regulator lube unit, clean filters and check regulators periodically.
- The RamPAC valve package does not require any lubrication, and operates best when there is as little oil as possible in the supply air.

Troubleshooting the Shut Height Control

NOTICE

IF PRESS DOES NOT RUN AFTER RAMPAC INSTALLATION

Check that the following connections are wired correctly according to the wiring diagrams at the back of the manual:

- RamPAC **TB3** pin **#375** (Ram Interrupt, Input 7)
- RamPAC **TB3** pin **#377** (Ram Stop, Input 9)

To troubleshoot and correct shut height control problems, use the table below and the error message explanations that follow.

Table 5-1. Troubleshooting the Shut Height Control

Problem	Diagnosis and solution
Ram will not move when you try to adjust shut height.	Ball socket mode enabled and crank angle is outside allowable adjustment range. See page 68. Move ram to TDC (0^{o}) $\pm$ 10^{o}.
Shut height readings differ from measurements made with a dial indicator.	Check transducer mounting. See page 13. Check transducer wiring. See page 37 or 39. Re-initialize RamPAC and use dial indicator to get true upper/lower limit. See page 62.
Shut height readings fluctuate in run mode during a stroke but return to normal at TDC. **Note:** *A fluctuation of a few thousandths is normal. A new press typically has .001" per inch of shaft diameter in each bearing. Check with your press manufacturer for acceptable wear specs.*	Bearing clearance affecting shut height If you do not know the bearing clearance, measure it. See page 122. If the bearing clearance the same value as the fluctuation, open up the positive (+) tolerance on shut height to the bearing clearance value. See page 67.
Shut height adjustment works in Manual mode, but not in Automatic mode.	Incorrect wiring Check that Up/Down Ram Adjust switch and Up/Down relays are wired properly. Check the LED indicators to confirm that relays are wired and operating correctly. See page 113.
During automatic adjustment, the ram goes up and down repeatedly, and never achieves the correct shut height.	Stop Advance may be set to 0 (zero) or to too small a value. Enter an appropriate value for Stop Advance. See pages 66 and 90.

The Shut Height Cannot Be Adjusted at the Current Press Angle

THE SHUT HEIGHT CANNOT BE ADJUSTED
AT THE CURRENT PRESS ANGLE.
The press needs to be moved to the top or bottom dead center
before the shut height can be adjusted.

Cause:

This error will appear when you have enabled Ball Socket mode in the Shut Height Init menu. Ball Socket mode requires the press crank to be within $\pm 10^{o}$ of top or bottom dead center for RamPAC to adjust the shut height automatically. See pages 25 and 68 for information about Ball Socket mode.

CAUTION

DIE DAMAGE ON BALL SOCKET PRESS

Enable Ball Socket mode in Initialization if RamPAC is installed on a ball socket press. [INITIALIZATION – RAMPAC INIT – SHUT HEIGHT SETUP]

On a ball-socket press, RamPAC will have accurate shut height information only at top dead center (TDC) or bottom dead center (BDC). If you have a ball socket press and disable Ball Socket mode, the automatic shut height adjustment will not work properly and die damage may occur.

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

Corrective action:

- **If this is a ball socket press:** Be sure the press is at top or bottom dead center before the RamPAC attempts to automatically adjust the shut height.
- **If this is a wrist pin press:** Either disable Ball Socket mode in the Shut Height Init menu (See page 68) **or** make sure the press is at top or bottom dead center before RamPAC automatically adjusts the shut height.

The Shut Height Is Not Correct

THE SHUT HEIGHT IS NOT CORRECT

The shut height is not set to the shut height setpoint.

Cause:

This error will appear in RUN mode, with the RAM MODE selector in AUTO, when you try to run the press when the ram is not at the shut height setpoint.

Corrective action:

1. Press RESET.
2. Turn the RAM ADJUST switch to the DOWN/AUTO position momentarily.

> **NOTICE**
>
> When you turn the RAM ADJUST switch momentarily to the DOWN/AUTO position
>
> - If the ram is above the set point, it moves down to it.
> - If the ram is below the set point, it moves up beyond the set point and then moves down to it.

The ram should move to the setpoint and in the SHUTHGT/CNTRBAL screen, the message SHUT HEIGHT IS AT SETPOINT should appear below the CURRENT SHUT HEIGHT display and stay there after the ram stops moving.

If the SHUT HEIGHT IS AT SETPOINT message does not stay on after the ram stops,

- Change the Stop Advance value in the RamPAC initialization menu. See "Entering a Value for Stop Advance," page 66 and "Setting Stop Advance," page 90.

or

- Adjust the shut height manually if your press's stopping distance is not consistent.

The Shut Height Is Outside of The Upper or Lower Limits

THE SHUT HEIGHT IS OUTSIDE OF THE UPPER OR LOWER LIMITS

Check the lower and upper limits and inspect the transducer to determine the problem.

Cause:
This error will appear in RUN mode, with the RAM MODE selector in AUTO, if the setpoint value entered in the PROG mode falls either below the lower limit, or above the upper limit.

Corrective action:

1. In the RUN mode, turn the RAM MODE switch to the MANUAL position.
2. Move the ram to the proper shut height and press the **F6** key. This will save the current shut height as the stored setpoint.

OR

1. Press RESET.
2. Go to the SHUTHGT/CNTRBAL screen in the tools programming menu (page 84).
3. Re-enter the correct Shut Height Setpoint that is between the upper and lower limits.

The Position Transducer Did Not Indicate That the Ram Was Moving

THE POSITION TRANSDUCER DID NOT INDICATE THAT THE RAM WAS MOVING

The ram adjust motor was running and the transducer did not show any movement.

Cause:

This error will appear when you try to adjust the ram, either in RUN mode, or in initialization, and the transducer does not move.

- The shut height transducer may have come loose.

or

- The ram starts moving very slowly, so that no ram motion occurs before the "startup time" expires. (RamPAC's startup timer monitors ram motion during ram adjustment.)

or

- The ram is not moving.

Corrective action:

1. Check that the bracket from the shut height transducer to the barrel is connected tightly at both ends and that the transducer is not physically damaged.

> **NOTICE**
>
> If both Up/Down Adjust switch and the Up/Down relays are wired backward, manual adjustment works properly, but automatic adjustment does not. Check the LED indicators to confirm proper wiring (see page 112).

2. Be sure that the transducer and the ram adjust switch are wired correctly (see Chapter 2).

> **NOTICE**
>
> If the ram adjustment moves very slowly, the startup timer may generate a fault. See startup timer information, below.

3. If the error still occurs, increase the allowable startup time by closing one of the switches in switch block S1, as indicated in the table below. See figure on page 36 for location of S1.
4. There could be a problem with your press. Be sure that the ram actually moves when you turn the RAM ADJUST switch. If it does not, there may be a problem with your ram adjust mechanism.

Table 5-2. Startup Time Settings at S1

Settings at Switch Block S1	Allowable Startup Time
All switches open (factory setting)	1 second
Switch 1 closed, all others open	2 seconds
Switch 2 closed, all others open	4 seconds
Switch 3 closed, all others open	6 seconds
Switch 4 closed, all others open	8 seconds

The Shut Height Control In the Manual Mode

THE SHUT HEIGHT CONTROL IN THE MANUAL MODE

The press cannot be run with the shut height control set to the manual mode.

Cause:

This error will appear when you try to run the press with the RAM MODE switch in the MANUAL position.

Corrective action:

Change the RAM MODE switch to either the AUTO or OFF position.

Shut Height Bottom Limit

SHUT HEIGHT BOTTOM LIMIT

The shut height has reached the bottom limit.

Cause:

This error will appear when you adjust the press in MANUAL mode to the lower limit.

Corrective action:

With the RAM MODE switch still in MANUAL, adjust the ram up (while this error is displayed RamPAC will not allow the ram to be adjusted down) with the RAM ADJUST switch. The error should clear itself when the shut height goes above the bottom limit.

Shut Height Upper Limit

SHUT HEIGHT TOP LIMIT

The shut height has reached the top limit.

Cause:

This error will appear when you adjust the press in MANUAL mode to the upper limit.

Corrective action:

With the RAM MODE switch still in MANUAL, adjust the ram down (while this error is displayed RamPAC will not allow the ram to be adjusted up) with the RAM ADJUST switch. The error should clear itself when the shut height goes below the top limit.

The RamPAC Shut Height Parameters Are Not Correct

THE RAMPAC SHUT HEIGHT PARAMETERS ARE NOT CORRECT
Check the shut height setpoint and make sure it is within the proper range, then check the upper and lower limits.

Cause:

This error may occur if you change the shut height upper and/or lower limits after you have programmed one or more tool shut height setpoints.

Corrective action:

Re-enter all the Shut Height initialization parameters, even if they look as if they are correct. Follow the steps below. For more information, see the instructions that start on page 62.

1. Enter Initialization mode and select RAMPAC INIT
2. Select **F3**, Shut Height Setup. The Shut Height Init menu appears.
3. Re-enter each of the parameters, even if they look correct. For each parameter, do the following:
    a. Highlight the parameter value and press ENTER. The value entry display appears.
    b. Key in the correct value.
    c. Press ENTER

Troubleshooting the Counterbalance Control

NOTICE

IF PRESS DOES NOT RUN AFTER RAMPAC INSTALLATION

Check that the following connections are wired correctly according to the wiring diagrams at the back of the manual:

- RamPAC **TB3** pin **#375** (Ram Interrupt, Input 7)
- RamPAC **TB3** pin **#377** (Ram Stop, Input 9)

To troubleshoot and correct counterbalance problems, use the table below and the error message explanations that follow.

Table 5-3. Troubleshooting the Counterbalance Control

Note: This information also applies to troubleshooting the cushion control

Problem	Diagnosis and solution
Counterbalance slowly fills to setpoint.	Clean the fill solenoid valve and replace o-ring, plunger and spring. See page 115.
Counterbalance fills to line pressure.	Is counterbalance in manual mode? If so, switch to automatic mode. Set the regulator on the counterbalance valve package to 20 PSI more than the pressure to balance the heaviest upper die. Check OUT6 LED on the PC board. See page 112. If it is on steadily when counterbalance is in automatic mode, this means the fill relay is stuck on. Call Wintriss Tech Support.
Counterbalance dumps at BDC.	Is firmware older than 1.18? If so, replace. See page 117. Clean debris from dump valve gasket. See page 114. Check dump solenoid valve and replace o-ring, plunger and spring. See page 115.
Counterbalance higher than setpoint.	Is counterbalance in manual mode? If so, switch to automatic mode. See page 84.
Counterbalance can't reach setpoint.	Make sure regulator on inlet line to counterbalance valve package is full open. Check air pressure with regulator on inlet line full open. If pressure is low, check air compressor and shop air lines. Make sure regulator on counterbalance valve package is set for 20 PSI more than the pressure required for the heaviest upper die. Is a green light flashing on fill solenoid on the valve package? If it is not, check the wiring between the fill solenoid valve and RamPAC. See page 50.
Counterbalance continually tries to fill when air compressor is off.	Make wiring change to prevent this. See "Optional Wiring When RamPAC Is On But Air Compressor Is Off," page 53.

Counter Balance Pressure Is Outside The Limits

The following error code appears on the LED display

F46

and the screen displays this message:

COUNTER BALANCE PRESSURE IS
OUTSIDE THE UPPER OR LOWER LIMITS
Check the cntr. bal. air pressure
and make sure it is set within the
limits for the loaded tool number.

Cause:

This error will appear in RUN mode when you have a Wintriss Clutch/Brake Control (WPC) monitoring counterbalance pressure at the same time that RamPAC is controlling the counterbalance pressure.

Corrective action:

- If your WPC clutch/brake control is monitoring counterbalance pressure with a pressure transducer:
  1. Disconnect the WPC pressure transducer.
  2. Connect a pressure switch to the WPC as instructed in the WPC manual, and set the switch to the pressure required to counterbalance the empty ram.
- If your WPC clutch/brake control uses a pressure switch to monitor minimum pressure:

  Change the pressure switch's setting to the pressure required to counterbalance the empty ram.

Refer to the table on page 104 for more information.

The Counterbalance Pressure Is Different Than The Setpoint

THE COUNTERBALANCE PRESSURE IS DIFFERENT THAN THE SETPOINT

the counterbalance pressure is not within the setpoint limits.

Cause:

This error will appear in RUN mode, when you try to run the press and the counterbalance pressure is not at its setpoint.

Corrective action:

1. Check the manual regulator on the valve package to be sure that it is set to a pressure 20 PSI greater than the pressure for the heaviest upper die you plan to run. To adjust, pull the regulator knob straight out and turn it clockwise to increase the pressure setting.
2. Check the manual regulator, if there is one, on the inlet line to the counterbalance valve package. It should be fully open.

Refer to the table on page 104 for more information.

The Counterbalance Pressure Is Below Min. Counterbalance Setpoint

THE COUNTERBALANCE PRESSURE IS BELOW MIN. COUNTERBALANCE PRESSURE

The counterbalance pressure is lower than min. allowed pressure.

Cause:

This error will appear in RUN mode, when you try to run the press with the counterbalance in MANUAL mode and the counterbalance pressure is below the minimum allowable pressure.

Corrective action:

Turn the counterbalance pressure up to the correct level with the manual regulator on the valve package.

OR

Change the counterbalance mode to AUTOMATIC in the tools programming menu, and enter an upper die weight.

The RamPAC Counterbalance Parameters Have Been Corrupted

THE RAMPAC COUNTERBALANCE PARAMETERS HAVE BEEN CORRUPTED. Check the counterbalance initialization parameters to make sure that they are set correctly.

Cause:

This error may occur because memory locations are different when you upgrade RamPAC firmware, or for other reasons.

Corrective action:

Re-enter all the Counterbalance initialization parameters, even if they look as if they are correct. Follow the steps below. For more information, see the instructions that start on page 72.

1. Enter Initialization mode and select RAMPAC INIT
2. Select **F4**, Counterbalance Setup. The Counterbalance Init menu appears.
3. Re-enter each of the parameters on this menu. For each parameter, do the following:
   a. Highlight the parameter value and press ENTER. The value entry display appears.
   b. Key in the correct value.
   c. Press ENTER

Troubleshooting the Cushion [or Other Pressure] Control

NOTICE

IF PRESS DOES NOT RUN AFTER RAMPAC INSTALLATION

Check that the following connections are wired correctly according to the wiring diagrams at the back of the manual:

- RamPAC **TB3** pin **#375** (Ram Interrupt, Input 7)
- RamPAC **TB3** pin **#377** (Ram Stop, Input 9)

To troubleshoot and correct cushion (or other pressure) control problems, use the table on page 104, the table below, and the error message explanations that follow the table below..

Table 5-4. Troubleshooting the Cushion [or Other Pressure] Control

See also Table 5-3, page 104

Problem	Diagnosis and solution
Run mode display shows a cushion pressure of 8 PSI even though the cushion pressure is set to 0 (zero) PSI or another value less than 8 PSI.	The lowest pressure RamPAC can regulate to is 8 PSI. Set the cushion (or other) pressure to its correct operating value (see page 89). If the tool you loaded does not use a cushion (or other pressure), set the operation mode to MANUAL (see page 84) and set the manual regulator on the cushion valve package to 0 (zero) PSI.
Cushion does not fill.	The manual regulator on the cushion valve package is closed (set to zero PSI) because the previous tool you loaded did not use an air cushion and was set up according to the instructions on page 84. Set the regulator on the cushion valve package to 20 PSI more than the maximum cushion pressure you intend to run with any tool (see “Installing Counterbalance and/or Cushion Control Valve Package(s),” page 26).

The Cushion [Or Other] Pressure Is Different Than The Setpoint

THE CUSHION [OR OTHER] PRESSURE IS DIFFERENT THAN THE SETPOINT.
It is not within the setpoint limits.

Cause:

This error will appear in RUN mode, when you try to run the press and the counterbalance pressure is not at its setpoint.

Corrective action:

1. Check the manual regulator on the valve package to be sure that it is set to a pressure 20 PSI greater than the pressure for the heaviest upper die you plan to run. To adjust, pull the regulator knob straight out and turn it clockwise to increase the pressure setting.
2. Check the manual regulator, if there is one, on the inlet line to the cushion [or other pressure] valve package. It should be fully open.

Refer to the table on page 104 for more information.

The RamPAC Did Not Receive a Zero Cam Signal from SmartPAC

THE RAMPAC DID NOT RECEIVE A ZERO CAM SIGNAL FROM SMARTPAC.
Check the wiring between the SmartPAC and the zero cam input. Use the zero cam LED for help.

Cause:

This error will appear when the zero cam input is not wired or has become disconnected.

CAUTION

BOTH INPUT CHECK AND ZERO CAM CIRCUITS WIRED WRONG

Be sure both these circuits are wired properly. If one is wired correctly and the other is not, RamPAC generates a fault. However, if both circuits are wired wrong so their signals are missing, RamPAC does not detect an error condition, and it could be possible to adjust the shut height while the press is running. Also, under this condition, the counterbalance pressure may not be set correctly.

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

Corrective action:

Check to be sure the zero cam input is wired. Use LED number DS5-8 to check this signal. (See figure on page 112 and table on page 113.) See wiring instructions on page 44 and the wiring diagrams at the end of the manual.

The RamPAC Did Not Receive an Input Check Signal from SmartPAC

THE RAMPAC DID NOT RECEIVE
AN INPUT CHECK SIGNAL FROM SMARTPAC.
Check the wiring between the SmartPAC and the input check input. Use the input check LED.

Cause:

This error will appear when the input check (dual safety valve ON) is not wired or has become disconnected.

CAUTION

BOTH INPUT CHECK AND ZERO CAM CIRCUITS WIRED WRONG

Be sure both these circuits are wired properly. If one is wired correctly and the other is not, RamPAC generates a fault. However, if both circuits are wired wrong so their signals are missing, RamPAC does not detect an error condition, and it could be possible to adjust the shut height while the press is running. Also, under this condition, the counterbalance pressure may not be set correctly.

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

Corrective action:

Check to be sure the input check circuit is wired. Use LED number DS1 to monitor this signal. (See figure on page 112 and table on page 113.) See page 44 and the wiring diagrams at the end of the manual.

The RamPAC Has Reset From an Electrical Noise Disturbance

THE RAMPAC HAS RESET FROM AN
ELECTRICAL NOISE DISTURBANCE.
Do not operate the press until you confirm that the current shut height setting is correct.

Cause:

Electrical noise has interfered with RamPAC's operation.

Corrective action:

Re-enter all the parameters in RamPAC's initialization menus, even if they look as if they are correct. Follow the steps below. For more information, see the instructions in Chapter 3.

1. Enter Initialization mode and select RAMPAC INIT.
2. Select **F3**, Shut Height Setup. The Shut Height Init menu appears.

3. Re-enter each of the parameters, even if they look correct. For each parameter, do the following:
    a. Highlight the parameter value and press ENTER. The value entry display appears.
    b. Key in the correct value.
    c. Press ENTER
4. Repeat steps 2 and 3 for Counterbalance (**F4**) and Cushion [or other pressure] (**F5**) setup menus.

Checking Input Check and Zero Cam Circuits

> **CAUTION**
>
> **BOTH INPUT CHECK AND ZERO CAM CIRCUITS WIRED WRONG**
>
> Be sure both these circuits are wired properly. If one is wired correctly and the other is not, RamPAC generates a fault. However, if both circuits are wired wrong so their signals are missing, RamPAC does not detect an error condition, and it could be possible to adjust the shut height while the press is running. Also, under this condition, the counterbalance pressure may not be set correctly.
>
> **Failure to comply with these instructions could result in property damage.**

Cause

RamPAC monitors and uses the Input Check and Zero Cam signals. If RamPAC detects that one of these circuits is wired wrong, but the other circuit is working correctly, you will get one of the following error messages.

> THE RAMPAC DID NOT RECEIVE A ZERO CAM SIGNAL FROM SMARTPAC.
> Check the wiring between the SmartPAC and the zero cam input. Use the zero cam LED for help.

> THE RAMPAC DID NOT RECEIVE
> AN INPUT CHECK SIGNAL FROM SMARTPAC.
> Check the wiring between the SmartPAC and the input check input. Use the input check LED.

Corrective action:

See “Checking Input Check and Zero Cam Circuits,” page 111.

Using Control Board LEDs

LEDs on the control board indicate the operation of various functions of RamPAC.

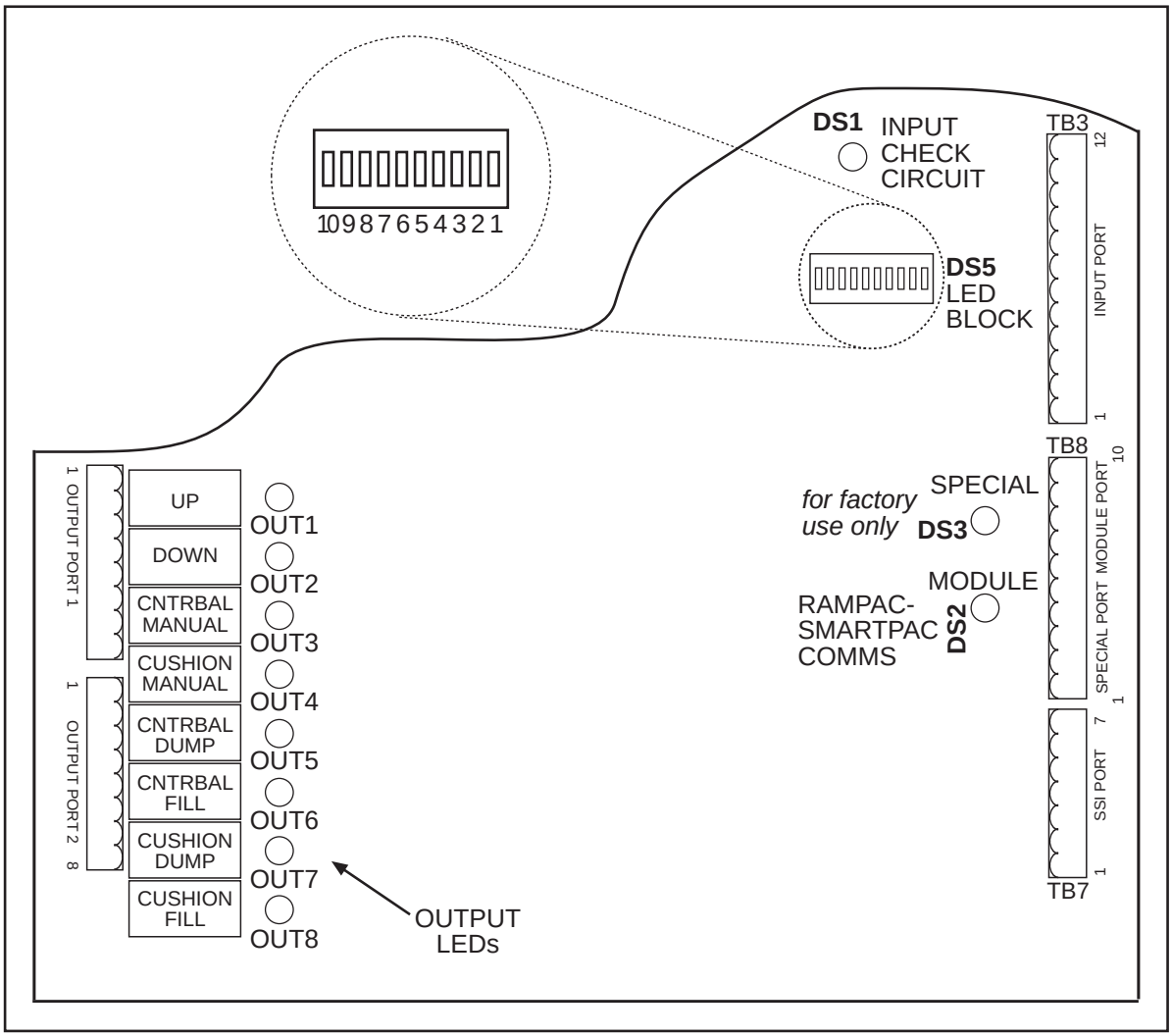


Figure 5-1. LEDs on RamPAC Board

Table 5-5. RamPAC control board LEDs

LED #	Function	Operation
DS1	INPUT CHECK CIRCUIT	ON when the press's clutch is engaged (press is running).
DS2 "MODULE"	RAMPAC-SMARTPAC COMMUNICATION	Flashes ON and OFF continually when RamPAC and SmartPAC are on.
DS3 "SPECIAL"	for factory use only	Not used. Should always be OFF.
DS5-1	UP	ON when selector is in UP position.
DS5-2	DOWN	ON when selector is in DOWN position.
DS5-3	no connection	Not used. Should always be OFF.
DS5-4	no connection	Not used. Should always be OFF.
DS5-5	AUTO	ON in AUTO mode. Should be OFF in "OFF" and "MANUAL" modes.
DS5-6	MANUAL	ON when selector is set to "MANUAL." Should be OFF in "OFF" and "AUTO" modes.
DS5-7	RAM INTERRUPT	Normally ON. Goes OFF when Ram Interrupt button is pressed.
DS5-8	ZERO CAM	ON when the press is at or near the top of the stroke.
DS5-9	ESTOP INPUT	Normally ON. If wired to the ESTOP circuit, should go OFF when the ESTOP button(s) are pressed.
DS5-10	no connection	Not used. Should always be OFF.
OUT1	UP	ON when UP relay is energized.
OUT2	DOWN	ON when DOWN relay is energized.
OUT3	COUNTERBALANCE MANUAL alternative valve package only	ON when COUNTERBALANCE MANUAL relay is energized. ON when counterbalance is disabled (in RamPAC Init menu).
OUT4	CUSHION MANUAL alternative valve packages only	ON when CUSHION MANUAL relay is energized. ON when cushion is disabled (in RamPAC Init menu).
OUT5	COUNTERBALANCE DUMP	ON when COUNTERBALANCE DUMP relay is energized.
OUT6	COUNTERBALANCE FILL	ON when COUNTERBALANCE FILL relay is energized. Pulses ON and OFF in AUTO mode. Steadily ON in MANUAL and when counterbalance control is disabled (in RamPAC Init menu) .
OUT7	CUSHION DUMP	ON when CUSHION DUMP relay is energized.
OUT8	CUSHION FILL	ON when CUSHION FILL relay is energized. Pulses ON and OFF in AUTO mode. Steadily ON in MANUAL and when cushion control is disabled (in RamPAC Init menu).

Removing Debris from Gasket of Fill or Dump Valve

1. Make sure press is at TDC. Shut off main counterbalance air line, and bleed tank(s).
2. Lock out power to SmartPAC unit.
3. If you did not previously label the "fill" and "dump" valves and cables, label them now. See page 27 for location. Remove the fill or dump solenoid connector by removing the screw and pulling off the connector.
4. Remove the four screws on the brass base of the fill/dump solenoid. DO NOT remove the 4 screws on top of solenoid.
5. Lift solenoid and gasket from valve.
6. Clean gasket by wiping it with a soft, dry cloth to remove any solid debris.
7. Reseat gasket as shown in the figure below, making sure the air holes line up.

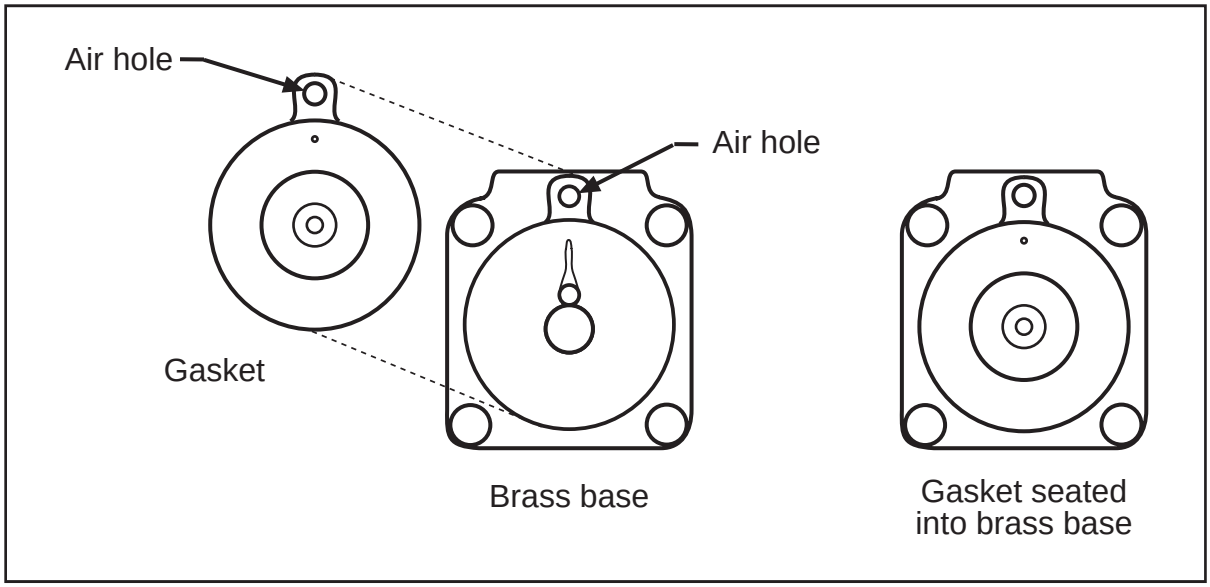


Figure 5-2. Replacing the gasket

8. Reseat the solenoid and brass base together into the valve.
9. Tighten down the 4 solenoid screws.
10. Connect solenoid connector and tighten down screw.
11. Turn on power.
12. Open main air valve to line pressure and set the manual regulator(s) on the valve package to the following pressure(s):

    Counterbalance: 20 PSI more than the pressure for the heaviest upper die you plan to run.

    Cushion: 20 PSI more than the highest cushion pressure you plan to run.

Replacing Components in Fill or Dump Valves

NOTICE

REPLACEMENT PARTS REQUIRED

Obtain a Herion valve rebuild kit before performing this procedure.

Before you perform this procedure, obtain a Herion valve rebuild kit (Wintriss replacement part number 2023301), which contains an o-ring, a plunger and a spring. Call Wintriss Tech Support to order a rebuild kit.

1. Make sure press is at TDC. Shut off main counterbalance air line and bleed tank(s).
2. Lock out power to SmartPAC unit.
3. Remove the fill or dump solenoid connector by removing the screw and pulling off the connector. "Fill" and "dump" should be labeled. If not, see the Figure 2-12 for location, and label the connectors now.
4. Remove the four screws on top of the fill/dump solenoid. DO NOT remove 4 screws on the brass base.
5. Lift solenoid off the base carefully. There are a spring and plunger loosely attached to the solenoid.
6. Replace the o-ring, plunger and spring provided in the Herion rebuild kit.
7. Reseat solenoid carefully. Remember that the plunger and spring sit loosely in the solenoid.
8. Tighten down the four top solenoid screws.
9. Reconnect solenoid connector and tighten down screw.
10. Turn on power.
11. Open main air valve to line pressure and set the manual regulator(s) on the valve package to the following pressure(s):

    Counterbalance: 20 PSI more than the pressure for the heaviest upper die you plan to run.

    Cushion: 20 PSI more than the highest cushion pressure you plan to run.

Checking the Fill and Dump Relays

> **⚠ WARNING**
>
> **ELECTRIC SHOCK HAZARD**
>
> - Use extreme caution when examining the LEDs inside the enclosure or console with the power on.
> - DO NOT touch anything inside the enclosure when power is on.
> - Ensure that this procedure is performed by qualified personnel only.
>
> **Failure to comply with these instructions could result in death or serious injury.**

1. Find the location of the RamPAC PC board. It is either in the console or an enclosure attached to the press.
2. Carefully open the panel on the console or enclosure, leaving the power on.
3. Locate the RamPAC PC board.
4. Find the fill or dump relay LED on the left side of the board. (See Figure 2-19 and the table below). Observe whether the LED is steadily illuminated or pulsing when you load a tool number.

Table 5-6. Fill / dump valve relay LEDs

Valve / Relay	LED
Counterbalance fill	OUT6
Counterbalance dump	OUT5
Cushion fill	OUT8
Cushion dump	OUT7

5. If the LED is steadily illuminated, check if counterbalance is in Manual Mode. If it is not in MANUAL mode, you may need to replace the RamPAC board. Contact Wintriss Tech Support.
6. If the LED is pulsing, the relay is operating properly. Close the panel.

Installing New RamPAC Firmware

⚠ WARNING

ELECTRIC SHOCK HAZARD

- Disconnect main power at SmartPAC and RamPAC before working inside the enclosure(s). All power to the press, press control, and other equipment used with the press must be off when you work inside the enclosure.
- Also "tagout" per OSHA 1910.147 Control of Hazardous Energy (Lockout/Tagout).
- Ensure that this procedure is performed by qualified personnel only.

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

CAUTION

INCORRECT SHUT HEIGHT, COUNTERBALANCE AND CUSHION PARAMETERS AFTER RAMPAC UPGRADE

- Before upgrading your RamPAC firmware, record the following parameters for the press and for each tool:

  SHUT HEIGHT INIT:
  [INITIALIZATION – RAMPAC INIT – SHUT HEIGHT SETUP]

  Shut height upper limit
  Shut height lower limit
  Stop advance
  Upper tolerance
  Lower tolerance

  COUNTERBALANCE INIT:
  [INITIALIZATION – RAMPAC INIT – COUNTERBALANCE SETUP]

  Maximum die weight
  Counterbalance pressure, zero die weight
  Counterbalance pressure, maximum upper die weight

  CUSHION INIT:
  [INITIALIZATION – RAMPAC INIT – CUSHION SETUP]

  Pulse time
  Function name

  COUNTERBALANCE AND SHUT HEIGHT MENU:
  [MAIN PROGRAMMING MENU – PROGRAM OR LOAD TOOL NUMBER – select tool # – SHUTGHT/CNTRBAL]

  Shut height setpoint
  Upper die weight

- Follow the instructions below for re-entering these parameters after you install the RamPAC firmware upgrade.
- DO NOT select Initialize Parameters after the upgrade, or you will have to completely re-program all the tools.

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

NOTICE

YOU MAY ALSO HAVE TO UPGRADE YOUR SMARTPAC FIRMWARE

If you are upgrading RamPAC from a previous version, your SmartPAC firmware may also have to be upgraded. Call Wintriss Tech Support for more information

1. **Verify that power has been turned <u>off</u> to SmartPAC and RamPAC, the press and any auxiliary equipment.**
2. Find the RamPAC board. It is in the console or in an enclosure attached to (or near) the press. All LEDs on the board should be off.
3. Locate the EPROM at U3. (See Figure 2-19.)
4. Note the orientation of the firmware chip. There is a semi-circular notch on the top of the chip. When you replace it, this notch *MUST* also be face up.
5. Remove the old chip with a chip puller, or insert a small screwdriver between the bottom of the chip and the socket. Be careful not to get the screwdriver under the socket itself. Carefully rock the chip out of its socket, lifting one end and then the other. Put the old chip in a safe place.

CAUTION

DAMAGE DUE TO STATIC ELECTRICITY

Ground yourself before removing the chip from its package by touching a large metal object, such as the press. Static electricity from your body can damage the chip.

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

6. Open the package containing the new firmware chip. Once you are "grounded," remove the chip from its holder. *Orient the chip so that the notch faces upward.*

CAUTION

INCORRECT INSTALLATION

Orient the chip so the notch faces upward. If you plug the chip in backward, it will be destroyed.

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

7. Gently try to plug the chip into its socket by first plugging in the left row of pins and then aligning the right row of pins over the socket openings and pushing straight in.

   If the two rows of pins are spread too far apart to plug easily into the socket:

   a. Hold the chip on its side on a clean, flat surface with the pins pointing towards you.
   b. Being careful NOT to overbend the pins, gently flex the top of the chip towards you. Turn the chip over so that the other row of pins is now on the surface pointing toward you. Flex it again, thus bending the other row of pins toward the opposite row.
   c. Try plugging the chip into the socket again, as in Step 8. If necessary, repeat Steps A and B.

8. Make sure that the notch in the chip is at the top and that all of the pins are in the socket.
9. Close the panel or enclosure.
10. Apply power to the SmartPAC and RamPAC. The "Welcome to the SmartPAC" screen should appear on SmartPAC.

    If it does not, turn the power off and repeat Step 7. Sometimes one or more pins are bent and not plugged in properly. If your unit still does not operate properly, contact Wintriss Tech Support.
11. Go to Main Initialization menu. (See page 59).
12. Select INSTALLED OPTIONS. The RamPAC should be listed with the version of its new firmware (for example, V1.33).
    - If it is, go to the next three sections and re-enter the parameters listed before running the press. These parameters are listed in the Caution message on page 117.
    - If it is not, contact Wintriss Tech Support.

Re-entering Shut Height Initialization Parameters after Upgrade

[MAIN INITIALIZATION MENU - RAMPAC INIT - **F3** (SHUT HEIGHT SETUP)]

> **NOTICE**
>
> Re-enter these values even though they may appear correct. In RamPAC version 1.30 and higher, the memory locations have changed. If you do not re-enter the values, they may become corrupted and cause problems.

Go to the Shut Height Init menu (under RamPAC Init) and re-enter the values for

- Upper Limit
- Lower Limit
- Stop Advance
- (+) Tolerance
- (–) Tolerance

Go to the next section.

Re-entering Counterbalance Parameters after Upgrade

[MAIN INITIALIZATION MENU - RAMPAC INIT - **F4** (COUNTERBALANCE SETUP)]

> **NOTICE**
>
> Re-enter these values even though they may appear correct. In RamPAC version 1.30 and higher, the memory locations have changed. If you do not re-enter the values, they may become corrupted and cause problems.

Go to the Counterbalance Init menu and enter the maximum upper die weight and the counterbalance pressures for zero and maximum upper die weights, as instructed on page 72.

Go to the next section.

Re-entering Tool Parameters after Upgrade

[TOP PROGRAM MENU – PROGRAM OR LOAD TOOL NUMBER – select tool # – SHUTGHT/CNTRBAL]

> **NOTICE**
>
> Re-enter these values even though they may appear correct. In RamPAC version 1.30 and higher, the memory locations have changed. If you do not re-enter the values, they may become corrupted and cause problems.

For each tool, re-enter the following parameters:

- Shut height setpoint
- Upper die weight

When you have completed re-entering the parameters as instructed in this and the previous two sections, you can run the press.

Checking the Counterbalance for Excessive Air Leakage

NOTICE

All counterbalance systems leak to some degree, so use the following only if there seems to be an excessive amount of air leakage.

1. Make sure press is at TDC.
2. Lock out main press power.
3. If your counterbalance system has an oil injection reservoir, check to see if it is clogged.
4. Using a sniffer or soapy water, check all plumbing connections for the counterbalance system.
5. If plumbing connections are leaking, tighten them down or re-plumb.
6. If the counterbalance cylinders are leaking, try lubricating the seals with oil. Contact the press manufacturer for best weight oil to use.
7. If excessive air leakage still exists, contact the press manufacturer.

Measuring the Ram Bearing Clearance

1. Grease the gibs so that the ram can move up and down freely.
2. Make sure press is at BDC.
3. Fill the counterbalance system to the pressure required for the heaviest die weight.
4. Place a hydraulic jack under each connection. Jack the ram up as far as it will go.
5. Using a dial indicator, measure the ram height from the bolster to the bottom of the ram, as close as possible to the connection(s).
6. Remove the jack(s).
7. Completely dump the counterbalance system, tanks and all.
8. Using the same dial indicator in the same location(s), measure the ram height from the bolster to the bottom of the ram.
9. Subtract the Step 8 ram height from the Step 5 ram height. This is your ram bearing clearance. If you measured the ram height in more than one location, figure out the bearing clearance at each location and average the clearances. See the example below.

> **NOTICE**
>
> You can take bearing clearance into account when you determine the shut height tolerances. See “Setting Shut Height Tolerances,” page 67.

Example

Step 5: BDC, ram jacked up, counterbalance set for maximum die weight

Step 5 ram height = 5.020”

Step 8: BDC, jacks removed, counterbalance completely dumped

Step 8 ram height = 5.000”

Bearing clearance = (Step 5 ram height) – (Step 8 ram height) =

5.020” – 5.000” = 0.020”

Appendix A – RamPAC Application Notes

Refer to the Application Notes on the following pages for examples of how to install the shut-height transducer on different kinds of presses.

Minster Knuckle Drive Press (1950s model)

The knuckle drive press shown in the diagram below was fitted with a read-out only version of the RamPAC shut height control because the ram has no automatic adjustment. The sensor was mounted to the frame of the press with the shaft connected to a bracket made out of bar stock bent to a 90° angle. The transducer can be mounted in either of the two orientations shown. The actual installation had the transducer mounted like the one on the right-hand side of the press.

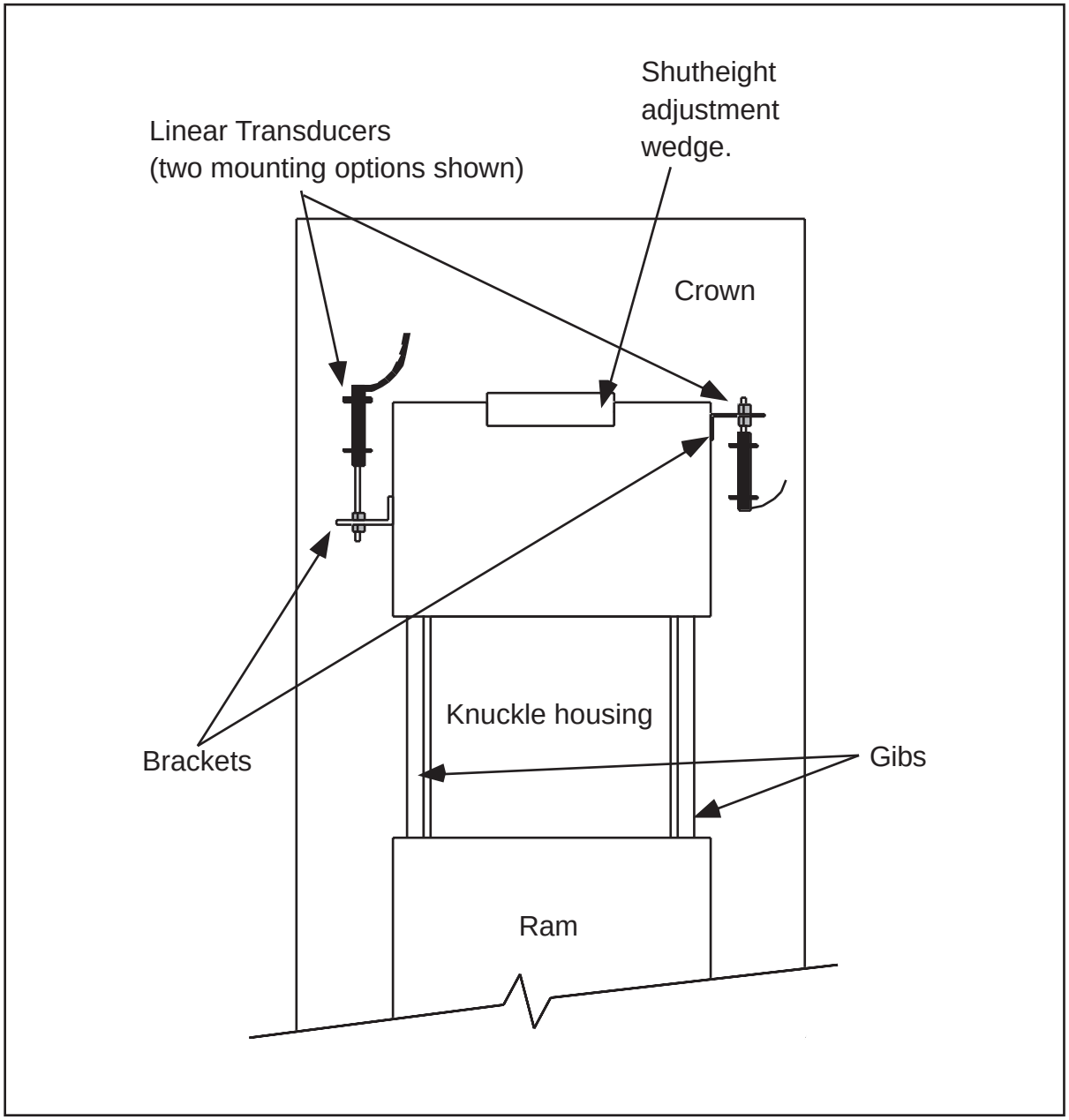


Figure A-1. Minster Knuckle Drive Press (1950s model)

400-ton Bliss Straight Side (1970s model), 200-ton Verson

This press is equipped with a motorized (electric) shut height adjustment mechanism. The transducer shaft is connected to a bracket coming up from the barrel. Another bracket comes up alongside the pitman and out to the shaft of the transducer. The part of the bracket connected to the top of the barrel is a piece of steel 1/2" x 3/4", about 6" long. The arm connecting to the transducer shaft is about 4" long, 1" wide and 3/8" thick. The transducer bracket is mounted on a piece of 3/8" x 4" flat stock and connected to the barrel with 3/4" spacers with bolts through them. In this diagram, the ram is adjusted all the way down.

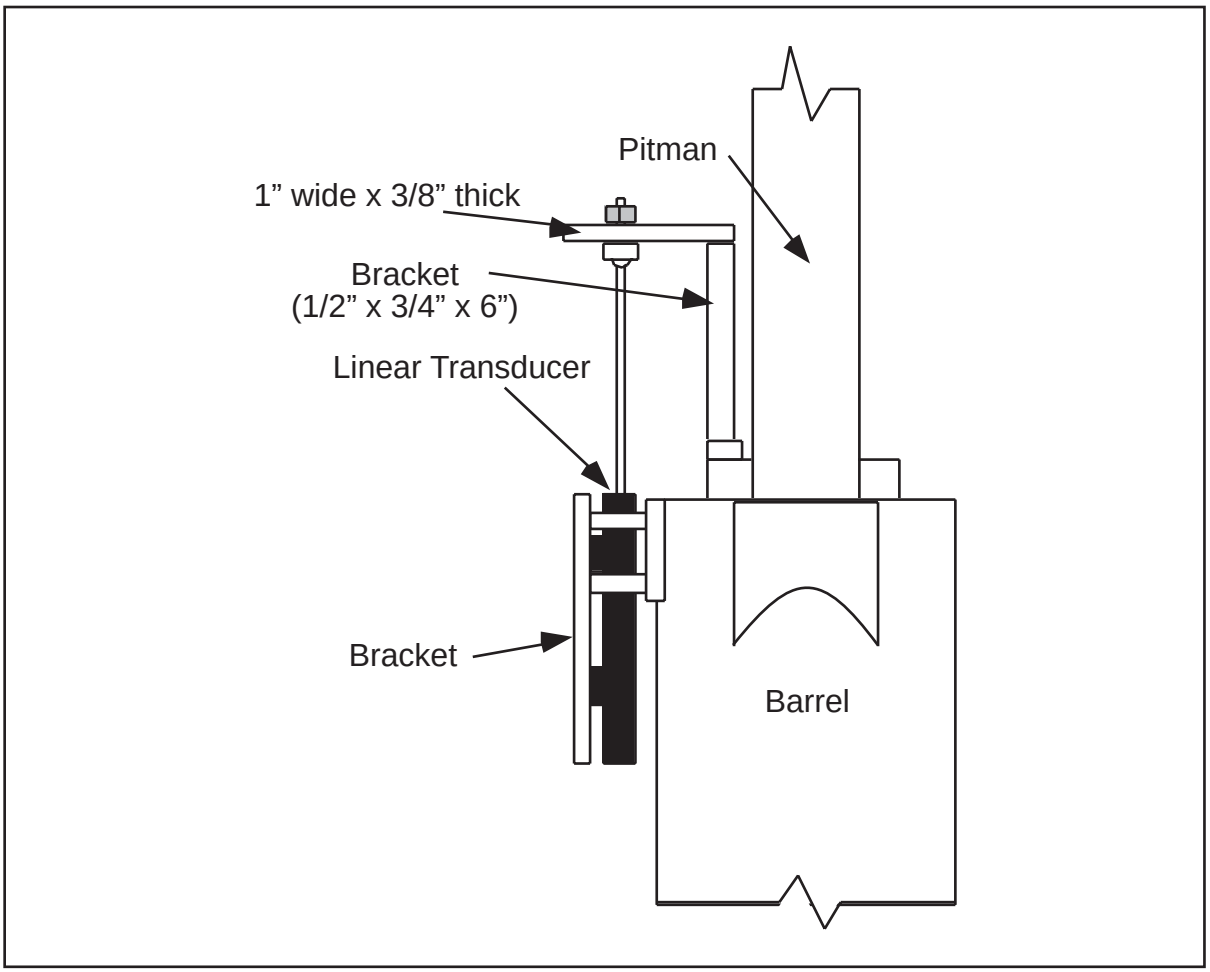


Figure A-2. 400-ton Bliss Straight Side (1970s model), 200-ton Verson

(Shut height adjusted to lower limit)

150 ton Minster G2 (gap frame)

This mounting is fairly simple, except that the bracket that comes off the barrel screw is one piece of machined steel. It is approximately 1/2" x 1/2" along the entire length of the bracket. The holes for the bolts that go into the barrel screw cap are slotted to help with proper alignment. This takes longer, but will also last longer and hold up against the harsh environment. The transducer bracket has four holes for bolts that go directly into the lip of the ram. It is a 3/8" x 3" piece of flat stock.

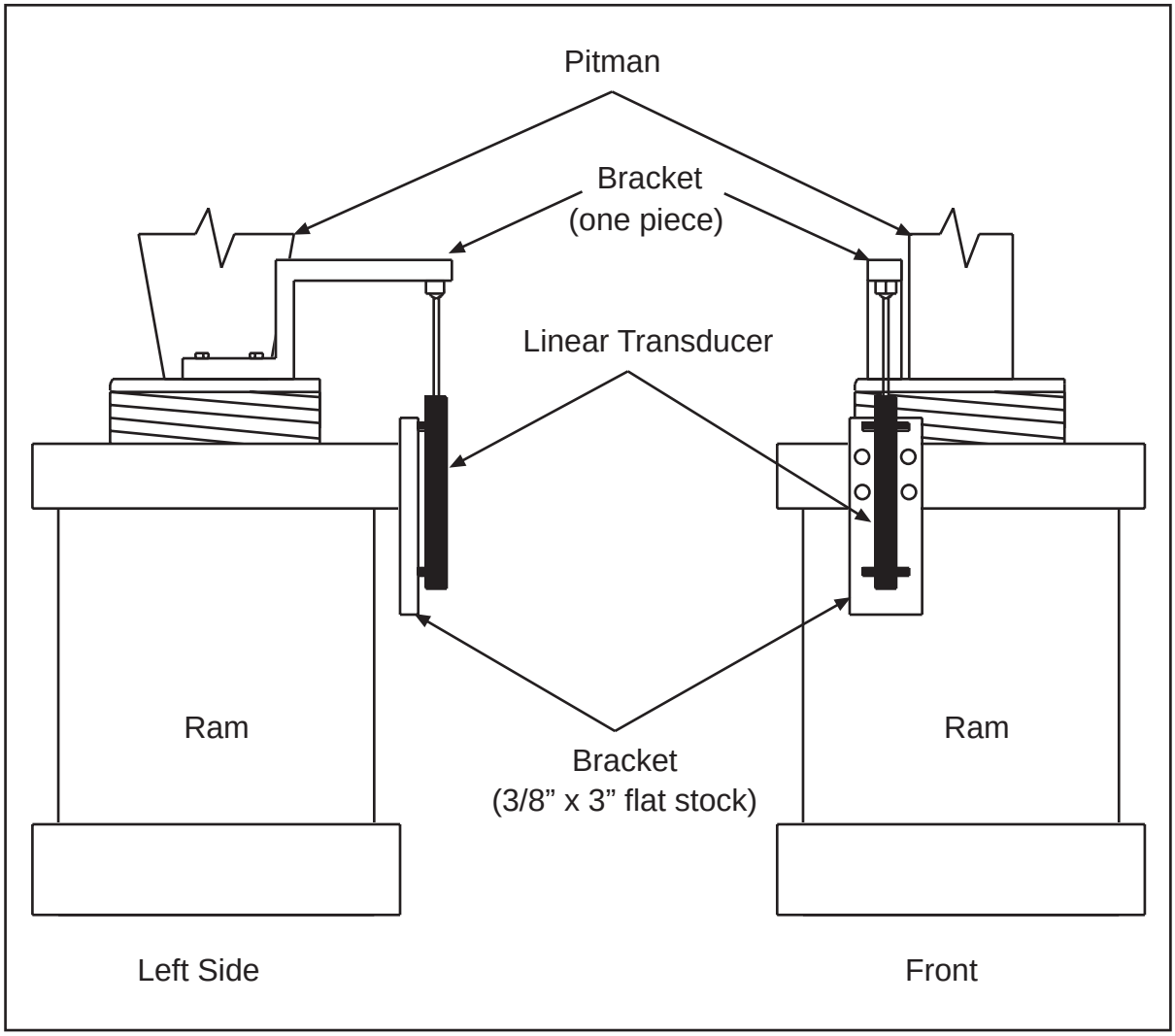


Figure A-3. 150-ton Minster G2 (gap frame)

200-ton Minster P2, 300-ton Verson

As part of the bracket for the linear transducer, we used the bracket that holds the mechanical limit switch actuator arm. A piece of heavy bar stock was mounted to the existing bracket with two bolts. The transducer was mounted directly to the inside wall of the ram. Sometimes this is not possible because there is not space to drill the holes. If this is the case, the transducer can be mounted to a heavy plate, which is mounted to the inside of the ram with four bolts near the top. The cable on this installation was brought out through a hole drilled in the ram.

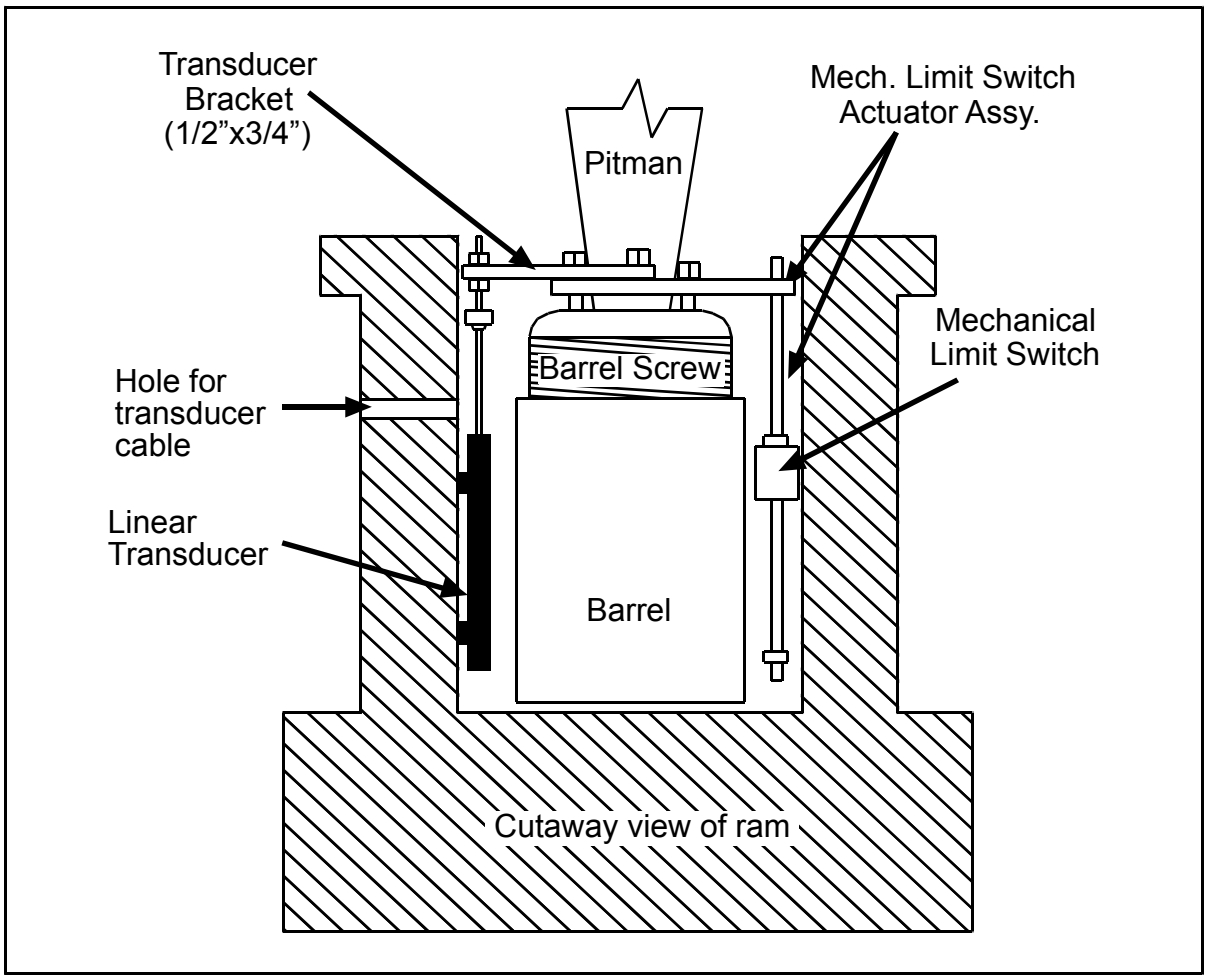


Figure A-4. 200-ton Minster P2, 300-ton Verson

200-ton Minster E2

This mounting is similar to the Minster P2. Again we utilized the bracket from the mechanical limits. A piece of threaded rod was used to get to the top of the ram and a piece of 3/8" x 1" flat stock was used to go over the top. The transducer was mounted inside a piece of heavy aluminum u-channel. After calibration of the transducer, flat stock, threaded rod, and bracket from the limit switch, were tacked together with a welder to ensure nothing would loosen up. In an installation like this, special care must be taken to make sure the bracket coming over the top of the ram does not hit any existing part of the press. In this case an oil splash guard had to be modified.

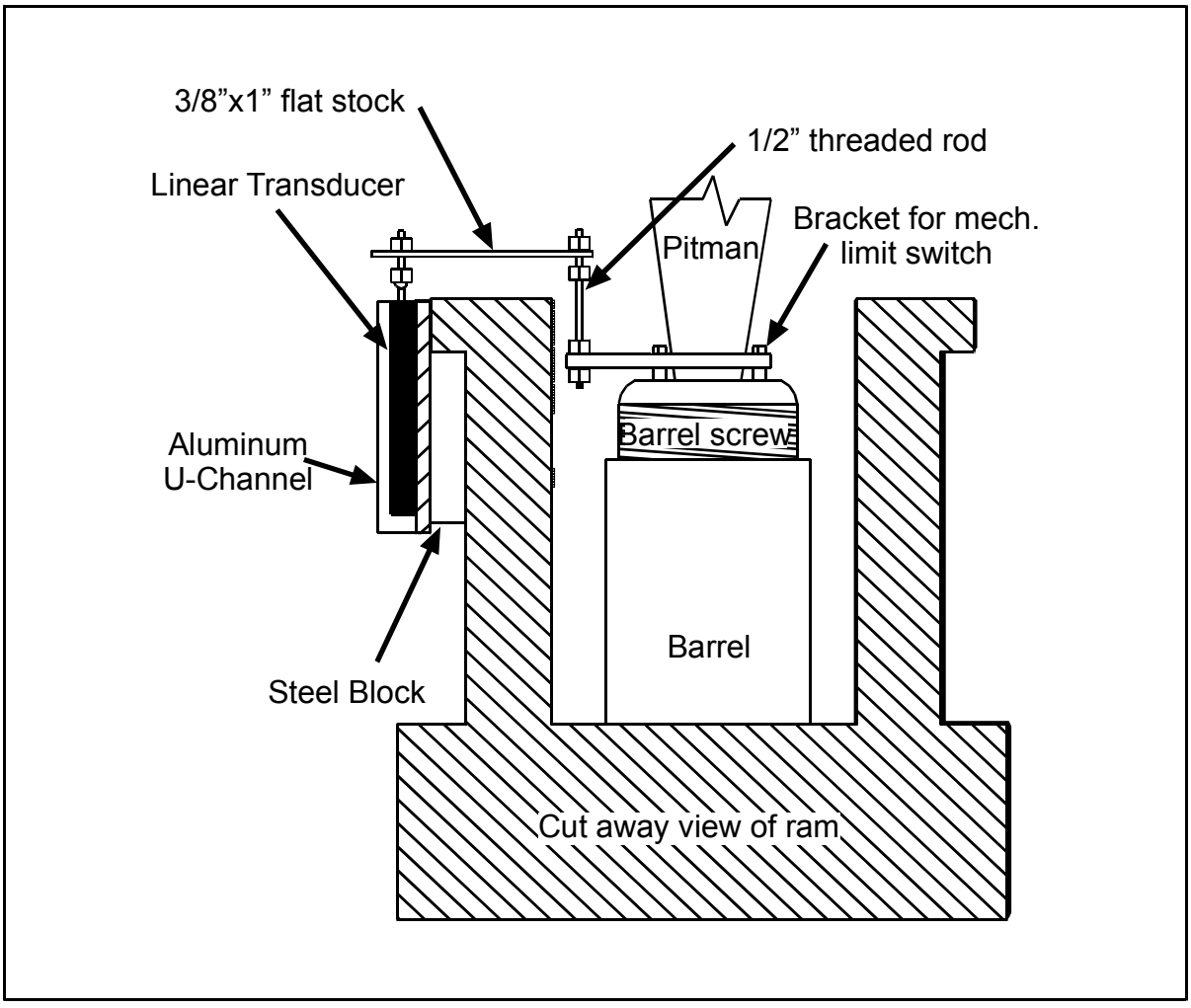


Figure A-5. 200-ton Minster E2

200-ton Niagara Straight Side

This mounting is similar to the 200 ton Mister E2 except that there is no bracket for the mechanical limit switch. Two pieces of 3/4" threaded rod is to be used to get to the top of the ram and a piece of 3/8" x 1" flat steel stock is used to attach the linear transducer to the barrel. The transducer is mounted to the outside of the ram perpendicular to the flat stock. It is very important to make sure that the flat stock and the transducer are perfectly aligned. If there is any deviation at all you run the risk of transducer failure and shut height errors. Special care must be taken to ensure the bracket coming over the top of the ram does not hit any existing part of the press.

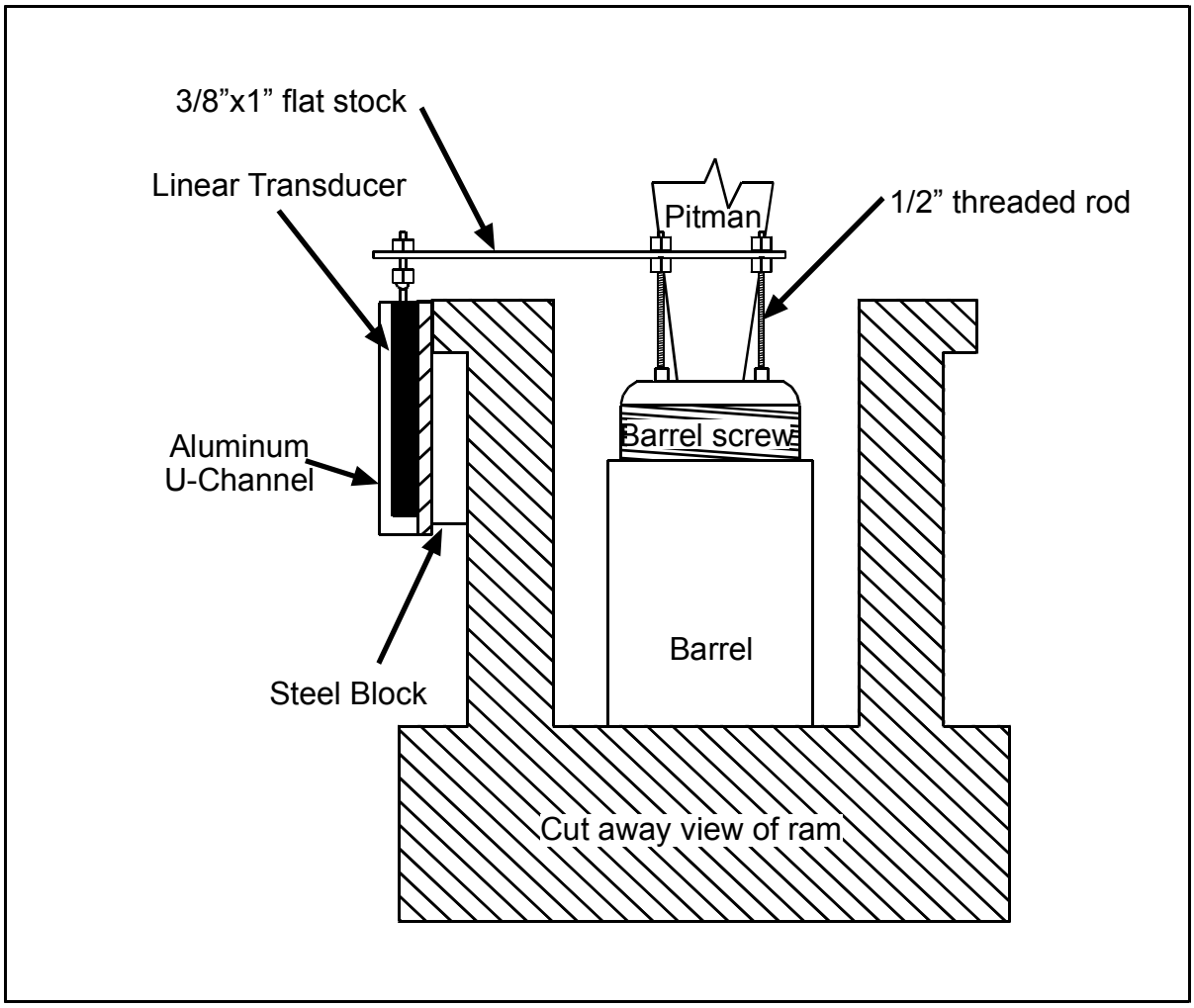


Figure A-6. 200-ton Niagara Straight Side

600-ton and 150-ton Verson, 600-ton Minster

These presses are equipped with a motorized (electric) shut height adjustment mechanism. The transducer shaft is connected to a bracket coming from inside the barrel. Another bracket comes up alongside the pitman and out to the shaft of the transducer. The part of the bracket connected to the top of the barrel is a piece of steel 1/2" x 3/4", about 6" long. The arm connecting to the transducer shaft is about 4" long, 1" wide and 3/8" thick. The transducer bracket is mounted on a piece of 3/8" x 4" flat stock and connected to the barrel with 3/4" spacers with bolts through them. In this diagram, the ram is adjusted all the way down.

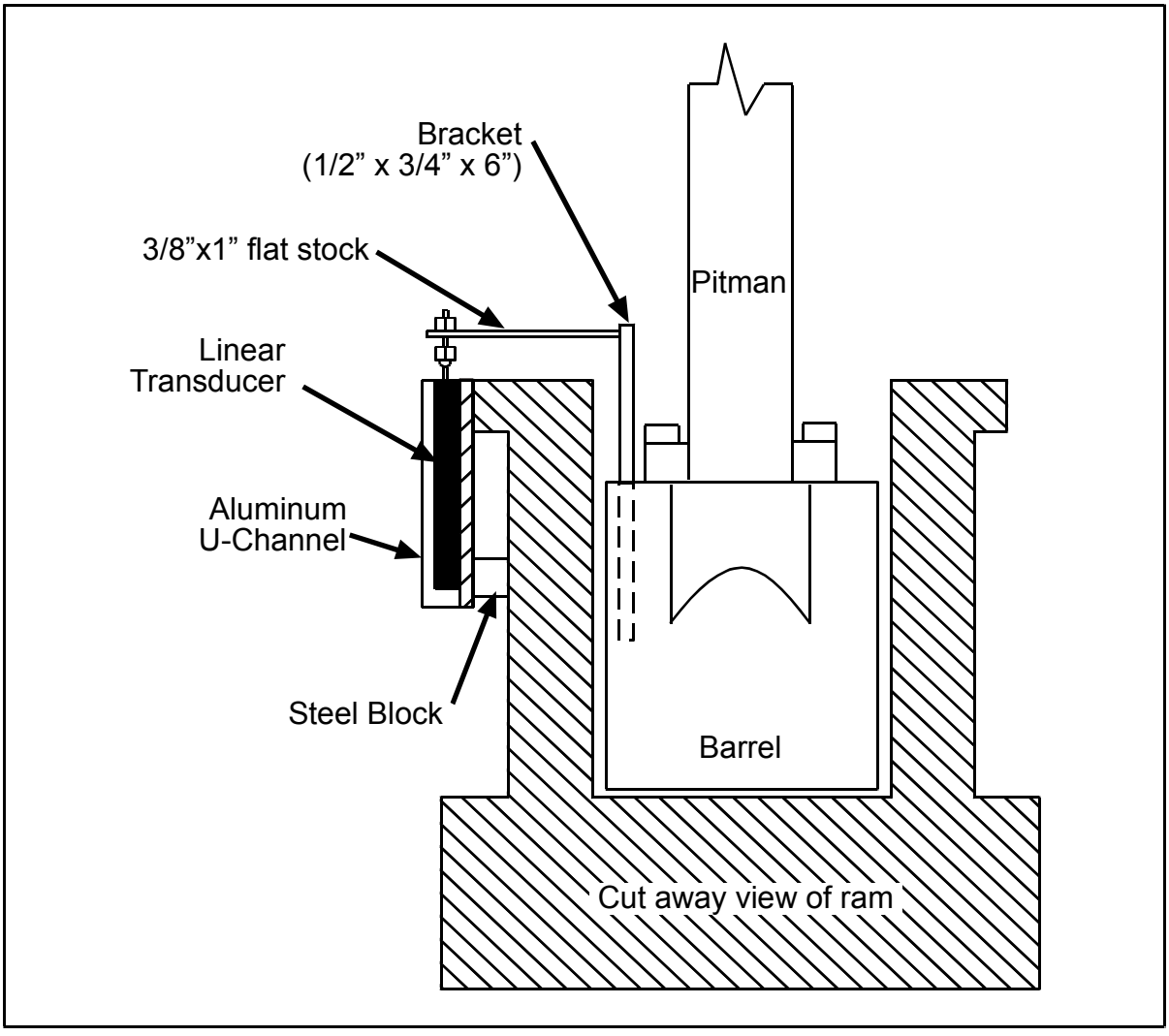


Figure A-7. 600-ton and 150-ton Verson, 600-ton Minster

Minster Model # 50-8-120

This press is equipped with a motorized (electric) shut height adjustment mechanism.

A ram adjust motor is centered between the two pitman arms. The motor turns the gears that are attached to the barrel. The transducer should be mounted near the pitman on the gearing platform. This is a unique application because the whole motor and gearing platform swings uniformly with the pitman. This makes it extremely important to make the bracket plumb with the transducer. The transducer rod is attached to a piece of stock connected to the pitman above the gearing. It is supported by another piece of stock mounted just below the first, creating a "T".

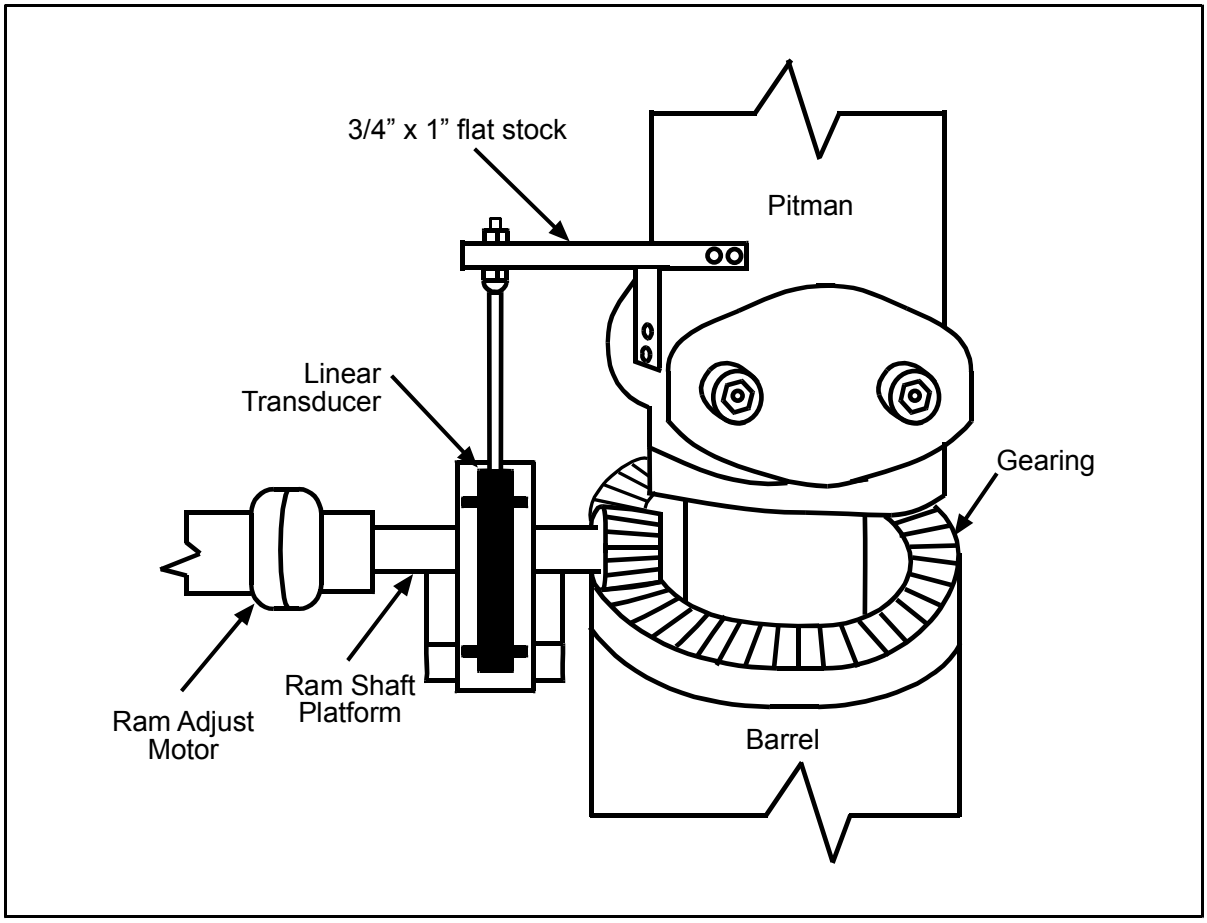


Figure A-8. Minster Model # 50-8-120

Appendix B – Wiring RamPAC Pressure Transducer

Cables for RamPAC pressure transducers normally come pre-wired with the connector that attaches to the transducer. If you wire your own cable to the connector, follow the instructions in this appendix.

Preparing the Cable and Wires

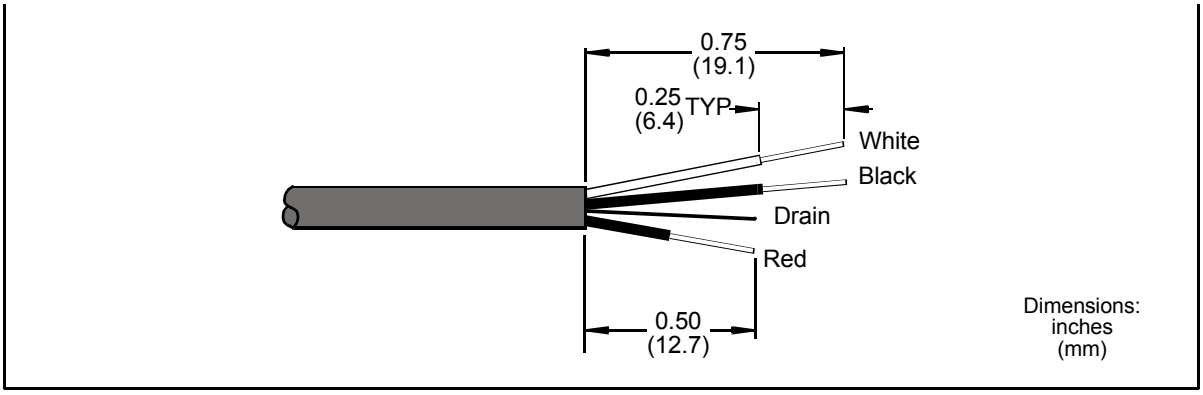


Figure B-1. Wire Preparation

Strip the cable jacket and wires as shown in the figure above and the table below. The colors may be different in your cable.

Table B-1. Wire Preparation and Pin Connections

	Wire Color	Total length strip and tin 0.25 in. (6.4 mm)	Transducer Connector Pin #	RamPAC Counter-balance TB1 Pin #	RamPAC Cushion TB1 Pin #
(shield)	Drain	0.50	1	*	*
Signal	White	0.75	2	392	389
Ground	Black	0.75	3	393	390
+12 VDC	Red	0.50	4	391	388

* Terminate shield to enclosure near entry point, either to a ground stud or to a bonding locknut, available from the factory

Connecting Wires and Assembling Connector

Feed the cable through the connector components as shown in Figure B-2. Solder the wires to the appropriate pins as shown in that figure and indicated in Table B-1. Complete assembly of the connector as shown in Figure B-3.

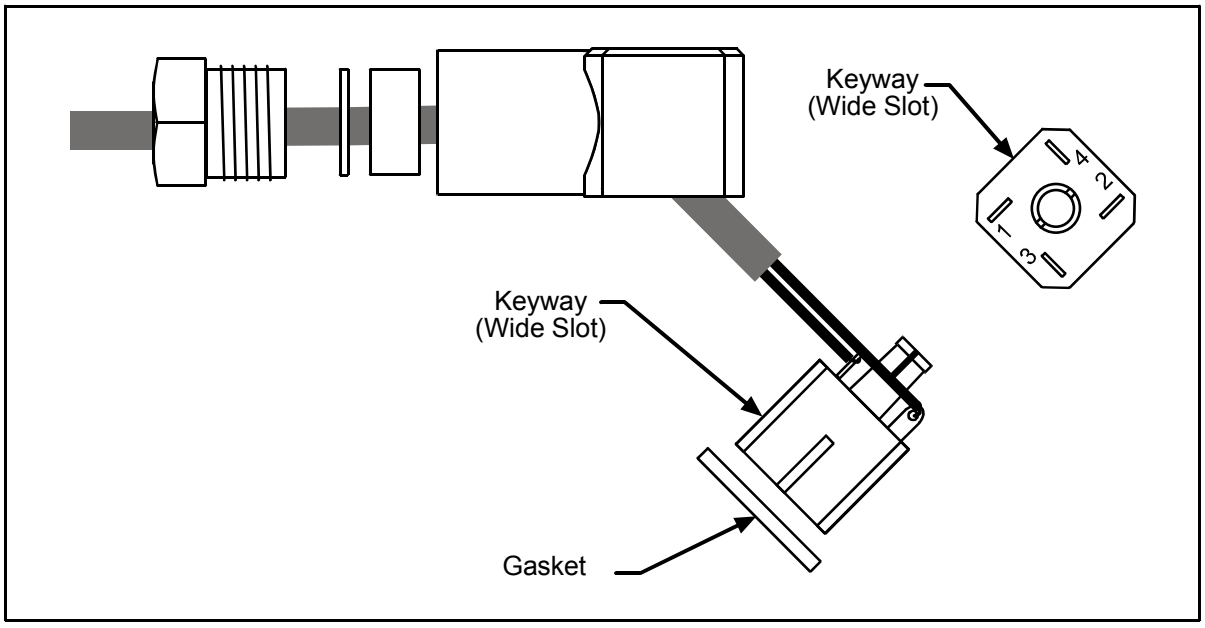


Figure B-2. Feeding Cable Through Connector and Connecting Wires

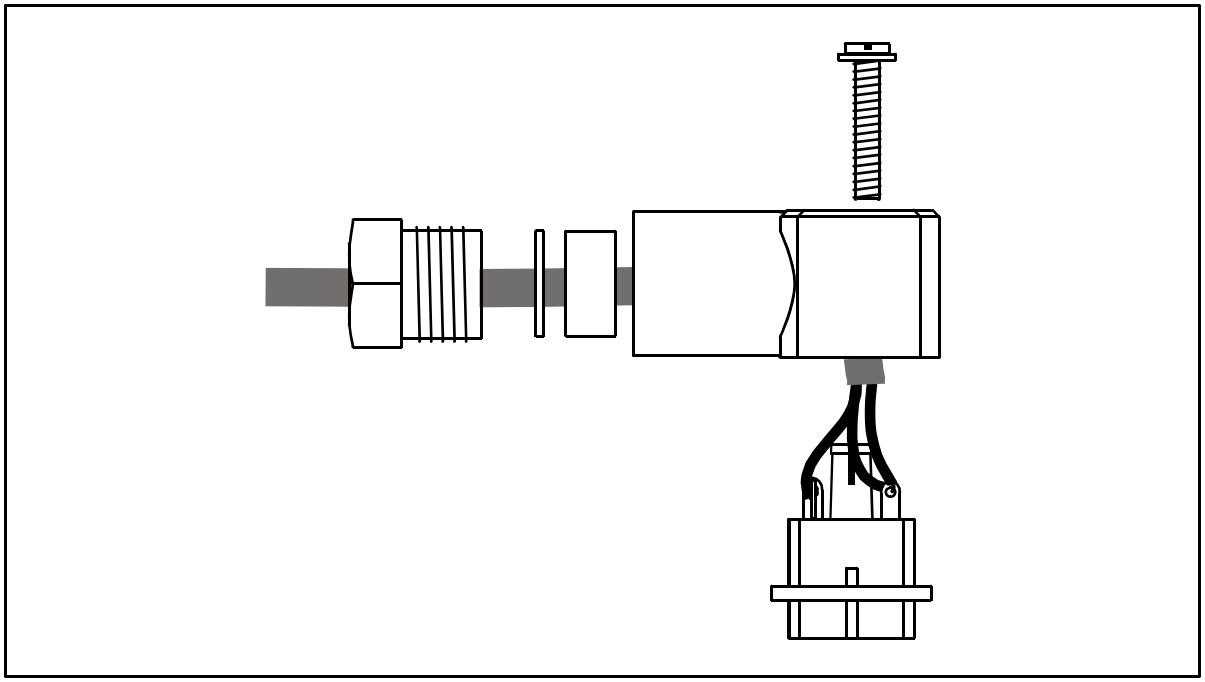


Figure B-3. Assembling Connector

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Wintriss User Manuals

Document Name	Document Number
AutoSet 1500	1088500
AutoSet 1500 Plus	1095100
AutoSet 1504	1099500
AutoSet 1504 Plus	1099600
AutoSetPAC (Tonnage Monitor)	1101600
Die Protection Handbook	1097100
DiPro 1500	1092000
DiPro Sensor Interface (DSI)	1100000
DSI 2 Sensor Interface	1121900
Machine Monitor	1124500
PACNet (Computerized Pressroom Reporting) & RSR	1109000
ProCam 1500	1095000
ProPAC (Process Monitor – In-die Measurement)	1117500
RamPAC (Shut Height, Counterbalance & Cushion Control)	1115200
RSR (Remote Storage & Retrieval)	1110700
Servofeed Interface – Coe/Wintriss	1105700
Servofeed Interface - CWP/Wintriss	1108100
Servofeed Interface - DiPro	1096300
Servofeed Interface - Electrocraft/Wintriss	1109200
Servofeed Interface - Indramat/Wintriss	1104500
Servofeed Interface - ProCam	1069100
Servofeed Interface - SmartPAC	1102500
Servofeed Interface - Waddington/Wintriss	1102700
Shadow I & II (& IV) Safety Light Curtain	1069100
Shadow V Safety Light Curtain	1087300
Shadow VI Safety Light Curtain	1107200
SmartPAC (w/ DiProPAC & ProCamPAC)	1107500
SmartPAC Hydraulic	1120800
SmartPAC Run Mode (Spanish)	1102900
SmartPAC w/ WPC II Integration	1107600
WaveFormPAC (Advanced Load Analyzer)	1109100
Wintriss Brake Monitor	1096400
WPC II Wintriss Press Control	1097400

RamPAC Press Setup Sheet

[INITIALIZATION – RAMPAC INIT]

Press Number	
Shop Air Pressure	

Shut Height Setup	
Shut height control	☐ Enabled ☐ Disabled
Shut height, upper limit	
Shut height, lower limit	
Stop Advance	
Upper tolerance (+)	+
Lower tolerance (–)	–
Units type	☐ LBS/IN/PSI ☐ Kg/MM/BAR ☐ Kg/MM/BAR ☐ Kg/MM/Kp
Ball/Socket Mode	☐ Enabled ☐ Disabled

Counterbalance Setup	
Counterbalance control	☐ Enabled ☐ Disabled
Counterbalance air pressure, empty ram	
Maximum upper die weight	
Counterbalance air pressure, maximum upper die weight	
Counterbalance minimum pulse time	msec
Setup Mode	☐ Enabled ☐ Disabled

Cushion Setup Note: You can use this function to control another pressure. Name it under “FUNCTION NAME”	
Cushion control	☐ Enabled ☐ Disabled
Cushion minimum pulse time	msec
Function name	

RamPAC Tool Setup Sheet

Tool number	
Shut height	
Upper die weight	
Cushion pressure	

Tool number	
Shut height	
Upper die weight	
Cushion pressure	

Tool number	
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Upper die weight	
Cushion pressure	

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RamPAC Tool Setup Sheet

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RamPAC Tool Setup Sheet

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RamPAC Tool Setup Sheet

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RamPAC Tool Setup Sheet

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Upper die weight	
Cushion pressure	

Tool number	
Shut height	
Upper die weight	
Cushion pressure	

REVISIONS			
REV	DESCRIPTION	DATE	APP'D

TO DSV ON SIGNAL

TO ESTOP CIRCUIT

GND
L2 (NEU)
L1 (120VAC)

MAIN POWER CONNECTOR TB101
1 201 (L1)
2 202 (L2)
3 203 (Gnd)
4 204 (Chas)
5 205 (A)
6 206 (B)
7 207 (ESTOP)
8 208 (ESTOP)
9 209 (SJ OUT)
10 210 (SJ OUT)
11 211 (Gnd)

TB203
1 258 (GRD)
2 257 (REMOTE RES.)

TB202
1 256 (GRD)
2 255 (LOCKOUT)
3 254 (OP STA 2)
4 253 (OP STA 1)

TB201
1 252 (GRD)
2 251 (CONT)
3 250 (S.S.)
4 249 (INCH/SETUP)
5 248 (OFF)

RESOLVER PORT TB106
1 212 (Shld)
2 213 (S1)
3 214 (S2)
4 215 (R1)
5 216 (S3)
6 217 (R2)
7 218 (S4)

WPC PORT TB104
1 219 (+RXD)
2 220 (-RXD)
3 221 (+TXD)
4 222 (-TXD)
5 223 (Gnd)

Wintriss SmartPAC

POSITION SENSOR TB107
1 245 (+V)
2 246 (Pos)
3 247 (Grd)

TB103
SPARE PORT
1 224 (+RXD3)
2 225 (-RXD3)
3 226 (TXD3)
4 227 (+TXD3)
5 228 (-TXD3)
6 229 (Grd)

CPR PORT
1 230 (+RXD4)
2 231 (-RXD4)
3 232 (TXD4)
4 233 (+TXD4)
5 234 (-TXD4)

TB102
SFI PORT
1 235 (+RXD1)
2 236 (-RXD1)
3 237 (TXD1)
4 238 (+TXD1)
5 239 (-TXD1)
6 240 (Grd)

MODULE PORT
1 241 (+RXD2)
2 242 (-RXD2)
3 243(+TXD2)
4 244(-TXD2)

RED BLK WHT GRN

CONNECT SHIELD TO THE ENCLOSURE AT THE CONDUIT ENTRY POINT

L2 (NEU)

UP STARTER — PACTRON

DOWN STARTER — PACTRON

C.B. DUMP SOLENOID VALVE — PACTRON

C.B. FILL SOLENOID VALVE — PACTRON

CUSH. DUMP SOLENOID VALVE — PACTRON

CUSH. FILL SOLENOID VALVE — PACTRON

SA Pressure Transducer

COUNTER BALANCE AIR PRESSURE TRANSDUCER (MOUNT IN ONE OF THE ACCUMULATOR TANKS)

SA Pressure Transducer

CUSHION AIR PRESSURE TRANSDUCER

RED WHT BLK SHLD

RED WHT BLK SHLD

SHLD

POSITION TRANSDUCER
1
2
3

TERMINAL STRIP INSIDE TRANS. JUNCTION BOX
RED/ORG — RED
YEL/GRN — WHT
BLK/BRN — BLK
SHLD — SHLD

SHLD TO BOX

L1 (120VAC)

TB1 ANALOG PORT
1 387 (LT)
2 388 (+12V)
3 389 (SA1)
4 390 (GND)
5 391 (+12V)
6 392 (SA2)
7 393 (GND)
8 394 (+5V)
9 395 (GND)
10 396 (+5 EXC)

TB6 OUTPUT PORT 1
1 397
2 398
3 399
4 400
5 401
6 402
7 403
8 404

TB9 OUTPUT PORT 2
1 405
2 406
3 407
4 408
5 409
6 410
7 411
8 412

GND
L2 (NEU)
L1 (120VAC)

MAIN POWER CONNECTOR TB4
1 379 (L1)
2 380 (L2)
3 381 (GND)
4 382 (CHAS)
5 383 (A)
6 384 (B)
7 385 (STOP)
8 386 (STOP)

SOURCING INPUTS

TB3 INPUT PORT
1 (INPUT 10) 378 — RAM STOP
2 (INPUT 9) 377 — ZERO CAM
3 (INPUT 8) 376 — RAM INTERRUPT
4 (INPUT 7) 375
5 (INPUT 6) 374
6 (INPUT 5) 373
7 (INPUT 4) 372
8 (INPUT 3) 371
9 (INPUT 2) 370
10 (INPUT 1) 369
11 (GND) 368
12 (+12V) 367

Wintriss RamPAC MODULE

TB8 MODULE PORT
1 (-TXD2) 366 — BLK
2 (+TXD2) 365 — RED
3 (-RXD2) 364 — GRN
4 (+RXD2) 363 — WHT
5 (GND) 362
6 (-TXD1) 361
7 (+TXD1) 360
8 (TXD1) 359
9 (-RXD1) 358
10 (+RXD1) 357

SPECIAL PORT

SHLD TO BOX

TB7 TRANSDUCER PORT
1 (-CLK) 356
2 (+CLK) 355
3 (-DATA) 354
4 (+DATA) 353
5 (+12V) 352
6 (GND) 351
7 (+24V) 350

NOTE: THE RAM STOP INPUT (TB3 INPUT 9) MUST BE CONNECTED TO AN ESTOP CIRCUIT OR IF NOT USED THEN IT MUST BE CONNECTED TO + 12 VDC.

ESTOP CIRCUIT

ESTOP INPUT CAN BE CONNECTED TO WPC TERM. #57 (ESTOP A INPUT).

RAM ADJUST INTERRUPT

OFF MANUAL AUTO XOO OOX

OFF DOWN UP XOO OOX

DOWN

UP

ALTERNATE UP/DOWN BUTTONS

DRAWN	ADB	DATE	7/30/01
CHK.			
APPROVALS			
ENG.			
MFG.			
FILENAME			
REL			

HONEYWELL
SENSING AND CONTROL

TITLE
RAMPAC/SMARTPAC
WIRING DIAGRAM

CODE IDENT NO.	SIZE	DRAWING NUMBER	REV
	D	FIG 1	

SCALE — SHEET OF

REVISIONS			
REV	DESCRIPTION	DATE	APP'D

NOTE: THE RAM STOP INPUT (TB3 INPUT 9) MUST BE CONNECTED TO AN ESTOP CIRCUIT OR IF NOT USED THEN IT MUST BE CONNECTED TO + 12 VDC.

TO DSV ON SIGNAL

TO ESTOP CIRCUIT

GND
L2 (NEU)
L1 (120VAC)

MAIN POWER CONNECTOR TB101
201 (L1)
202 (L2)
203 (Grd)
204 (Chas)
205 (A)
206 (B)
207 (ESTOP)
208 (ESTOP)
209 (STOP)
210 (STOP)
211 (Grd)

TB203
258 (GRD)
257 (REMOTE RES.)

TB202
256 (GRD)
255 (LOCKOUT)
254 (OP STA 2)
253 (OP STA 1)

TB201
252 (GRD)
251 (CONT)
250 (S.S.)
249 (INCH/SETUP)
248 (OFF)

RESOLVER PORT TB106
212 (Shld)
213 (S1)
214 (S2)
215 (R1)
216 (S3)
217 (R2)
218 (S4)

WPC PORT TB104
219 (+RXD)
220 (-RXD)
221 (+TXD)
222 (-TXD)
223 (Gnd)

Wintriss SmartPAC

POSITION SENSOR TB107
245 (+V)
246 (Pos)
247 (Grd)

TB103
SPARE PORT
224 (+RXD3)
225 (-RXD3)
226 (TXD3)
227 (+TXD3)
228 (-TXD3)
229 (Grd)
230 (+RXD4)
231 (-RXD4)
232 (TXD4)
233 (+TXD4)
234 (-TXD4)

TB102
SFI PORT / MODULE PORT
235 (+RXD1)
236 (-RXD1)
237 (TXD1)
238 (+TXD1)
239 (-TXD1)
240 (Grd)
241 (+RXD2)
242 (-RXD2)
243 (+TXD2)
244 (-TXD2)

RED
BLK
WHT
GRN

CONNECT SHIELD TO THE ENCLOSURE AT THE CONDUIT ENTRY POINT

L2 (NEU)

UP STARTER
PACTRON

DOWN STARTER
PACTRON

C.B. DUMP SOLENOID VALVE
PACTRON

C.B. FILL SOLENOID VALVE
PACTRON

CUSH. DUMP SOLENIOD VALVE
PACTRON

CUSH. FILL SOLENOID VALVE
PACTRON

COUNTER BALANCE AIR PRESSURE TRANSDUCER (MOUNT IN ONE OF THE ACCUMULATOR TANKS)

SA Pressure Transducer

CUSHION AIR PRESSURE TRANSDUCER

SA Pressure Transducer

RED
WHT
BLK

RED
WHT
BLK

POSITION TRANSDUCER
3
2
1

TERMINAL STRIP INSIDE TRANS. JUNCTION BOX

RED/ORG		RED
YEL/GRN		WHT
BLK/BRN		BLK
SHLD		SHLD

SHLD TO BOX

L1 (120VAC)

TB1 ANALOG PORT
1 387 (LT)
2 388 (+12V)
3 389 (SA1)
4 390 (GND)
5 391 (+12V)
6 392 (SA2)
7 393 (GND)
8 394 (+5V)
9 395 (GND)
10 396 (+5 EXC)

TB6 OUTPUT PORT 1
397
398
399
400
401
402
403
404

TB9 OUTPUT PORT 2
405
406
407
408
409
410
411
412

GND
L2 (NEU)
L1 (120VAC)

MAIN POWER CONNECTOR TB4
379 (L1)
380 (L2)
381 (GND)
382 (CHAS)
383 (A)
384 (B)
385 (STOP)
386 (STOP)

Wintriss RamPAC MODULE

TB3 INPUT PORT
SOURCING INPUTS
(INPUT 10) 378
(INPUT 9) 377
(INPUT 8) 376
(INPUT 7) 375
(INPUT 6) 374
(INPUT 5) 373
(INPUT 4) 372
(INPUT 3) 371
(INPUT 2) 370
(INPUT 1) 369
(GND) 368
(+12V) 367

RAM STOP
ZERO CAM
RAM INTERRUPT

SHUTHEIGHT MONITOR
OFF AUTO

TB8 MODULE PORT
(-TXD2) 366
(+TXD2) 365
(-RXD2) 364
(+RXD2) 363
(GND) 362
(-TXD1) 361
(+TXD1) 360
(TXD1) 359
(-RXD1) 358
(+RXD1) 357

BLK
RED
GRN
WHT

SHLD TO BOX

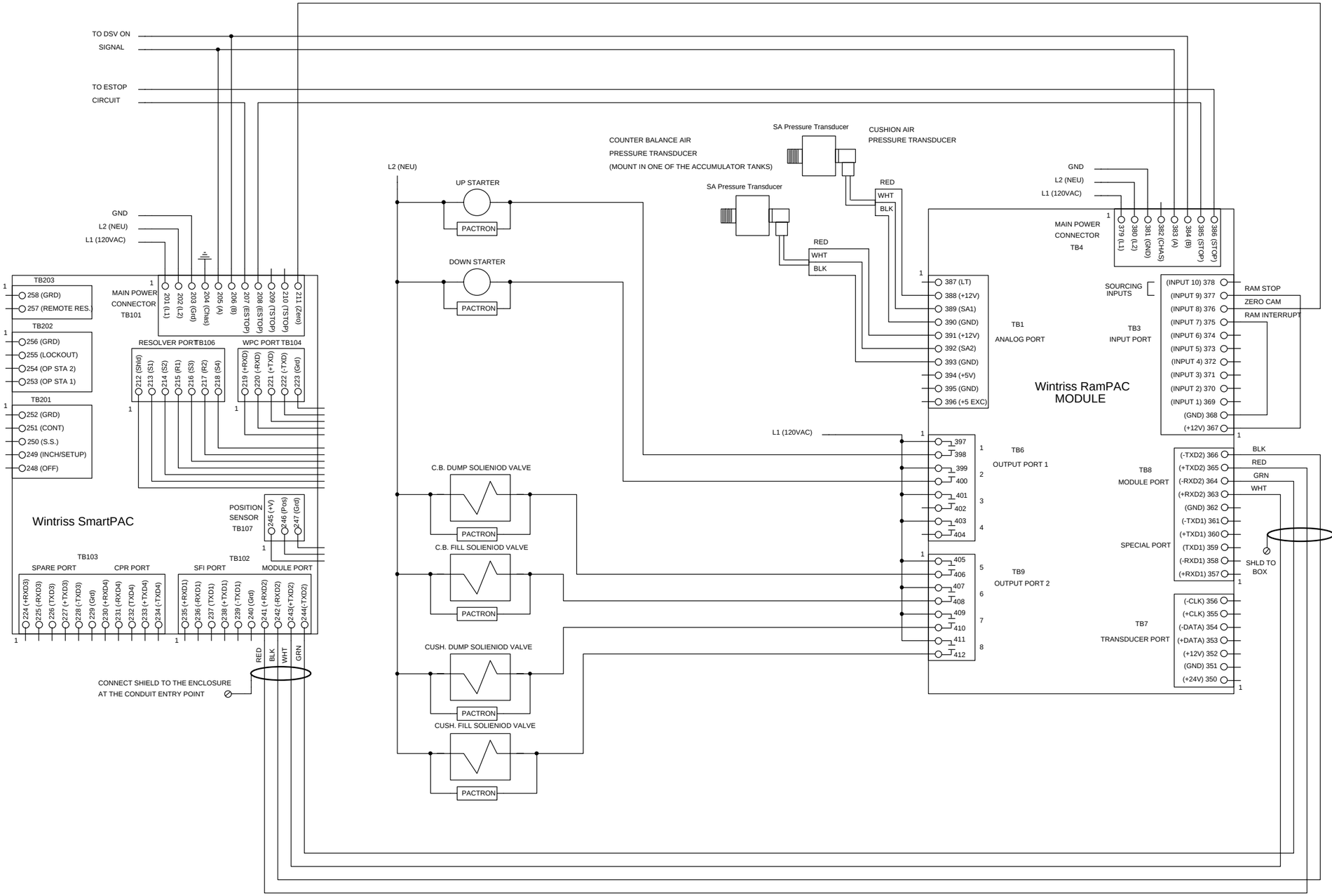
SPECIAL PORT

TB7 TRANSDUCER PORT
(-CLK) 356
(+CLK) 355
(-DATA) 354
(+DATA) 353
(+12V) 352
(GND) 351
(+24V) 350

DRAWN ADB	DATE 7/30/01	**HONEYWELL** SENSING AND CONTROL	
CHK.			
APPROVALS		TITLE RAMPAC/SMARTPAC (Shutheight monitor) WIRING DIAGRAM	
ENG.			
MFG.			
FILENAME		CODE IDENT NO.	SIZE D / DRAWING NUMBER FIG 2 / REV
REL		SCALE	SHEET OF

REVISIONS			
REV	DESCRIPTION	DATE	APP'D

NOTE: THE RAM STOP INPUT (TB3 INPUT 9) MUST BE CONNECTED TO AN ESTOP CIRCUIT OR IF NOT USED THEN IT MUST BE CONNECTED TO + 12 VDC.



DRAWN	ADB	DATE	7/30/01
CHK.			
APPROVALS			
ENG.			
MFG.			
FILENAME			
REL			

HONEYWELL
SENSING AND CONTROL

TITLE
RAMPAC/SMARTPAC (Counter balance only)
WIRING DIAGRAM

CODE IDENT NO.	SIZE	DRAWING NUMBER	REV
	D	FIG 3	
SCALE		SHEET OF	

REVISIONS			
REV	DESCRIPTION	DATE	APP'D

NOTE: THE RAM STOP INPUT (TB3 INPUT 9) MUST BE CONNECTED TO AN ESTOP CIRCUIT OR IF NOT USED THEN IT MUST BE CONNECTED TO + 12 VDC.

TO DSV ON SIGNAL

TO ESTOP CIRCUIT

GND
L2 (NEU)
L1 (120VAC)

TB203
258 (GRD)
257 (REMOTE RES.)

TB202
256 (GRD)
255 (LOCKOUT)
254 (OP STA 2)
253 (OP STA 1)

TB201
252 (GRD)
251 (CONT)
250 (S.S.)
249 (INCH/SETUP)
248 (OFF)

Wintriss SmartPAC

MAIN POWER CONNECTOR TB101
201 (L1)
202 (L2)
203 (Gd)
204 (Chas)
205 (A)
206 (B)
207 (ESTOP)
208 (ESTOP)
209 (TSTOP)
210 (TSTOP)
211 (Aux2)
212 (Shld)

RESOLVER PORT TB106
213 (S1)
214 (S2)
215 (R1)
216 (S3)
217 (R2)
218 (S4)

WPC PORT TB104
219 (+RXD)
220 (-RXD)
221 (+TXD)
222 (-TXD)
223 (Gnd)

POSITION SENSOR TB107
245 (+V)
246 (Pos)
247 (Gnd)

TB103 SPARE PORT
224 (+RXD3)
225 (-RXD3)
226 (TXD3)
227 (+TXD3)
228 (-TXD3)
229 (Gnd)
230 (+RXD4)
231 (-RXD4)
232 (TXD4)
233 (+TXD4)
234 (-TXD4)

TB102 SFI PORT / MODULE PORT
235 (+RXD1)
236 (-RXD1)
237 (TXD1)
238 (+TXD1)
239 (-TXD1)
240 (Gnd)
241 (+RXD2)
242 (-RXD2)
243(+TXD2)
244(-TXD2)

RED
BLK
WHT
GRN

CONNECT SHIELD TO THE ENCLOSURE AT THE CONDUIT ENTRY POINT

L2 (NEU)

UP STARTER
DOWN STARTER
PACTRON

C.B. AUTO/MANUAL SOLENOID VALVE
TURNS OFF IN MANUAL MODE

CUSH. AUTO/MANUAL SOLENOID VALVE
TURNS OFF IN MANUAL MODE

C.B. DUMP SOLENOID VALVE

C.B. FILL SOLENOID VALVE

CUSH. DUMP SOLENOID VALVE

CUSH. FILL SOLENOID VALVE

COUNTER BALANCE AIR PRESSURE TRANSDUCER (MOUNT IN ONE OF THE ACCUMULATOR TANKS)

SA Pressure Transducer

CUSHION AIR PRESSURE TRANSDUCER

SA Pressure Transducer

RED
WHT
BLK
SHLD

POSITION TRANSDUCER

TERMINAL STRIP INSIDE TRANS. JUNCTION BOX
RED/ORG
YEL/GRN
BLK/BRN
SHLD

SHLD TO BOX

L1 (120VAC)

TB1 ANALOG PORT
387 (LT)
388 (+12V)
389 (SA1)
390 (GND)
391 (+12V)
392 (SA2)
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395 (GND)
396 (+5 EXC)

TB6 OUTPUT PORT 1
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TB9 OUTPUT PORT 2
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411
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GND
L2 (NEU)
L1 (120VAC)

MAIN POWER CONNECTOR TB4
379 (L1)
380 (L2)
381 (GND)
382 (CHAS)
383 (A)
384 (B)
385 (STOP)
386 (STOP)

SOURCING INPUTS

TB3 INPUT PORT
(INPUT 10) 378
(INPUT 9) 377
(INPUT 8) 376
(INPUT 7) 375
(INPUT 6) 374
(INPUT 5) 373
(INPUT 4) 372
(INPUT 3) 371
(INPUT 2) 370
(INPUT 1) 369
(GND) 368
(+12V) 367

RAM STOP
ZERO CAM

Wintriss RamPAC MODULE

TB8 MODULE PORT
(-TXD2) 366
(+TXD2) 365
(-RXD2) 364
(+RXD2) 363
(GND) 362
(-TXD1) 361
(+TXD1) 360
(TXD1) 359
(-RXD1) 358
(+RXD1) 357

BLK
RED
GRN
WHT

SPECIAL PORT

SHLD TO BOX

TB7 TRANSDUCER PORT
(-CLK) 356
(+CLK) 355
(-DATA) 354
(+DATA) 353
(+12V) 352
(GND) 351
(+24V) 350

ESTOP CIRCUIT

ESTOP INPUT CAN BE CONNECTED TO WPC TERM. #57 (ESTOP A INPUT).

RAM ADJUST INTERRUPT

OFF
MANUAL
AUTO
XOO
OOX

OFF
DOWN
UP
XOO
OOX

DOWN
UP

ALTERNATE UP/DOWN BUTTONS

DRAWN	ADB	DATE	7/30/01
CHK.			
APPROVALS			
ENG.			
MFG.			
FILENAME			
REL			

HONEYWELL
SENSING AND CONTROL

TITLE
RAMPAC/SMARTPAC WITH ROSS COUNTER BALANCE VALVE WIRING DIAGRAM

CODE IDENT NO.	SIZE	DRAWING NUMBER	REV
	D	FIG 4	
SCALE		SHEET OF	