WINTRISS ®

User Manual

AutoSet® *PAC*

Wintriss Load Analyzer
A SmartPAC® *Module*
1101600
Rev. P   October 2020

Tech Support Hotline   800-586-8324   8-5 EST

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Changes for Revision P of the AutoSetPAC User Manual (1101600)

This revision of the AutoSetPAC user manual covers AutoSetPAC software version 2.48 and higher. The changes include:

- Updates to wiring tables.

Thank you for purchasing a Wintriss Product. We appreciate your business and want to do whatever we can to ensure your satisfaction. Wintriss products are built to stay on the job day after day, and are backed by an ironclad guarantee, international standards approvals, and unbeatable support. Whenever you need assistance or service, we back all our products with excellent spare parts inventories, training programs, and prompt repair service. We would like to share with you a list of service options–probably the largest number of service options offered in the industry.

- **Technical Assistance**

We offer a toll-free line for technical assistance. Call our Wintriss Technical Support Hotline at 1-800-586-TECH (8324) should you have any questions about your equipment. Our technical staff is ready to assist you Monday through Friday, 8 a.m. to 5 p.m. EST. In many cases our experienced technical staff can resolve your inquiry right over the phone.

- **Return Authorization**

Please call our 800 number for a return authorization (RMA) number to return a product for repair. Returned goods must arrive freight prepaid. In order to process your return quickly, we ask that you provide us with the following pertinent information when you call: purchase order number, shipping address, contact name and telephone number, and product type. The assigned RMA number should appear on all packages returned to Wintriss Controls Group to ensure prompt service.

At the time of requesting an RMA, you will be quoted a flat-rate repair price for the product you are returning. We ask that you either e-mail/fax us a PO for that amount or enclose the PO with the returned item. This will enable us to ship the item back to you as soon as the repair has been completed. If the item cannot be repaired or there are additional charges, you will be contacted for approval.

Please be sure to carefully pack all returned items and ship to our Acton, MA location.

- **Expedited Repair Program**

Rush service providing 48 hour turnaround is available for most products upon request. An Expedite Fee will be applied to our standard repair rate.

- **Board Exchange Program**

If your needs are urgent, you can take advantage of our Board Exchange (EX) program. Call our 800 number between 8 a.m. and 3:30 p.m. ET and we will send a replacement to you overnight. A fee does apply to this service. Contact Wintriss Technical Support at 800-586-8324 for details.

- **Service Center**

Our Service Center for product service is located at our headquarters in Acton MA. If your equipment requires repair, please contact us at 800-586-8324 to obtain a return authorization number. Nationwide field service is also available. Contact the Wintriss Technical Support group at 800-586-8324.

- **Product Training**

We also offer both product training and maintenance/troubleshooting courses at our Acton, MA and Chicago-area facilities. On-site training is available from the factory or through your local Wintriss representative.

- **Restocking Charge**

Returned goods are subject to a 20% restocking charge if returned for credit. The minimum charge is $50, not to exceed $250 per item.

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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How to Use This Manual

This manual shows you how to install, calibrate, program, run, and troubleshoot AutoSetPAC 2-Channel and 4-Channel load analyzers. In some places, this manual assumes that you are running AutoSetPAC with a SmartPAC 2 control, but the instructions also apply to AutoSetPACs connected to an original SmartPAC or SmartPAC PRO.

Chapter 1 provides an overview of AutoSetPAC features and operation.

Chapter 2 shows you how to mount and wire AutoSetPAC.

Chapter 3 shows you how to enter AutoSetPAC settings in SmartPAC Initialization mode and calibrate AutoSetPAC.

Chapter 4 shows you how to establish AutoSetPAC setpoint percentages and a sample period for each tool in SmartPAC Program mode.

Chapter 5 shows you how to view and adjust programmed AutoSetPAC settings in SmartPAC Run mode.

Chapter 6 shows you how to respond to AutoSetPAC faults and troubleshoot common AutoSetPAC problems.

The Glossary provides definitions of some of the terms used in the manual that may be unfamiliar to you.

Wiring diagrams at the end of the manual show connections between AutoSetPAC and all three versions of SmartPAC (original SmartPAC, SmartPAC 2, SmartPAC PRO) and the connections necessary to conduct a loopback test.

NOTICE

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Important Highlighted Information

Important danger, warning, caution and notice information is 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 you should remember, including tips to aid you in performance of your job.

Warranty

Wintriss Controls warrants that 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 (SFC), 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. Wintriss'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 Wintriss Controls freight prepaid and which are, after examination, disclosed to the satisfaction of Wintriss 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 Wintriss Controls. No other warranty is expressed or implied. Wintriss 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.

Please note:

It is solely the user's responsibility to properly install and maintain Wintriss controls and equipment. Wintriss Controls manufactures its products to meet stringent specifications and cannot assume responsibility for consequences arising from their misuse.

Chapter 1   Introduction

NOTICE

THE NAME "AUTOSETPAC"

The name "AutoSetPAC" as used in this manual refers to the original SmartPAC, SmartPAC 2, or SmartPAC PRO Press Automation Control with the AutoSetPAC option.

"SmartPAC" refers to original SmartPAC, SmartPAC 2, and SmartPAC PRO, unless otherwise indicated.

NOTICE

AUTOSETPAC 2 AND 4 CHANNEL UNITS

AutoSetPAC 2 and 4 channel units were previously called 1500 and 1504, respectively.

NOTICE

USING YOUR AUTOSETPAC WITH DIFFERENT VERSIONS OF SMARTPAC

You can use your AutoSetPAC with

- original SmartPAC

- SmartPAC 2

- SmartPAC PRO

Figures 1-1 and 1-2 show the front panels of the three SmartPAC versions. They are similar, but have the following differences:

- Original SmartPAC: separate entry keypad, 8 separate function (F) keys

- SmartPAC 2: separate entry keypad, 6 separate function keys

- SmartPAC PRO: entry keys and function keys appear on the touch screen display

Be sure to read the instructions on the display and the labels for the function keys.

This manual shows original SmartPAC screens. SmartPAC 2 and SmartPAC PRO screens are similar. The menu organization is the same on all versions.

Chapter 2 gives instructions for installing AutoSetPAC on a SmartPAC. Refer to the appropriate wiring diagrams at the end of the manual.

Chapters 3 through 6 tell how to initialize, program, run, and troubleshoot your AutoSetPAC/SmartPAC system. Refer to your SmartPAC manual.

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SmartPAC with AutoSetPAC is a reliable, easy-to-use load monitoring system that provides overload and underload protection for your press and dies without the need to change settings manually on each die change. AutoSetPAC creates load limits, or setpoints, automatically for any job. Setpoints can be changed immediately based upon the actual load of your press.

AutoSetPAC also includes the repeatability feature that provides more precise, reliable stroke-to-stroke protection on your press. AutoSetPAC reduces unnecessary downtime and improves process control. SmartPAC with AutoSetPAC comes in 2- or 4-input options.

AutoSetPAC Benefits

AutoSetPAC provides the following benefits:

- Identifies machine overloading, enabling you to prevent unnecessary wear on load-bearing components

- Provides repeatability, or stroke-to-stroke, tonnage monitoring. Repeatability setpoints allow you to monitor your stamping process more precisely, enabling you to detect punch breakage, quality problems, and loss of tonnage due to end of stock. Repeatability setpoints also allow you to relax the high and low setpoint tolerances, thus avoiding nuisance stops due to acceptable variance in material thickness and hardness.

- Displays and monitors reverse tonnage, which helps you to avoid excessive "snap through" overloads. Press manufacturers typically recommend that reverse loads not exceed 15% to 25% of total press capacity.

- Stops the press after a bad stroke, preventing successive bad hits and, possibly, catastrophic damage to the die.

- Allows more accurate tool setups by providing actual tonnage information. Information can be stamped on the die shoe per OSHA regulation 1910.217 (d) (6) (i).

- Monitoring of tonnage variations allows you to detect misfeeds, slug stacking, misuse of stop blocks, changes in material thickness and hardness, broken stripper springs, and broken punches in the die. One operator can monitor several presses at a time because AutoSetPAC stops the press when these and other malfunctions are detected.

- Diagnoses tool wear by monitoring tonnage increases as a die is re-used. This enables you to schedule repairs to dies and punches, resulting in more efficient use of the press, faster parts production, and higher quality parts. In addition, SmartPAC keeps track of the number of hits on the tool being run, helping you determine when the die requires maintenance.

- Enables better matching of dies to press capacity. Since AutoSetPAC displays the exact tonnage produced by each die, you can avoid using large-capacity presses for smaller jobs or overloading a small-capacity press with too large a job.

SmartPAC PRO, SmartPAC 2, and Original SmartPAC

Your AutoSetPAC can be used with the SmartPAC PRO, SmartPAC 2, and original SmartPAC.

To install AutoSetPAC on a SmartPAC, follow the instructions in Chapter 2 and refer to the appropriate wiring diagrams at the end of the manual. (Wiring diagrams show connections for original SmartPAC, SmartPAC 2, and SmartPAC PRO.)

AutoSetPAC menu organization in SmartPAC 2 and SmartPAC PRO is similar to that in original SmartPAC, and the AutoSetPAC screens are similar in all SmartPACs. As a result, you can refer to the screens and follow the steps provided in chapters 3-6 of this manual to initialize, program, run, and troubleshoot AutoSetPAC in original SmartPAC, SmartPAC 2, and SmartPAC PRO. The main differences among the three SmartPACs are in their panel displays, as shown in Figure 1-1 and Figure 1-2.

SmartPAC 2 and SmartPAC PRO operate much like the original SmartPAC, which you may already have in your plant.

All the PAC module options for SmartPAC work with SmartPAC 2 and SmartPAC PRO.

If you are familiar with the original SmartPAC, you will find using the SmartPAC 2 and SmartPAC PRO similar. Figure 1-1 and Figure 1-2 shows the differences between their front panels. Some of the instructions in this manual are based on the instructions for the original SmartPAC.

Figure 1-1 and Figure 1-2 show the differences between the keyboard and display of your SmartPAC 2 or SmartPAC PRO and the original SmartPAC.

Since SmartPAC 2 and SmartPAC PRO have eight function keys and the original SmartPAC has only six, the function keys will be different in many instances. These are also called "F keys." Be sure to read the instructions on the display and read the descriptive labels next to the function keys before you press a function key.
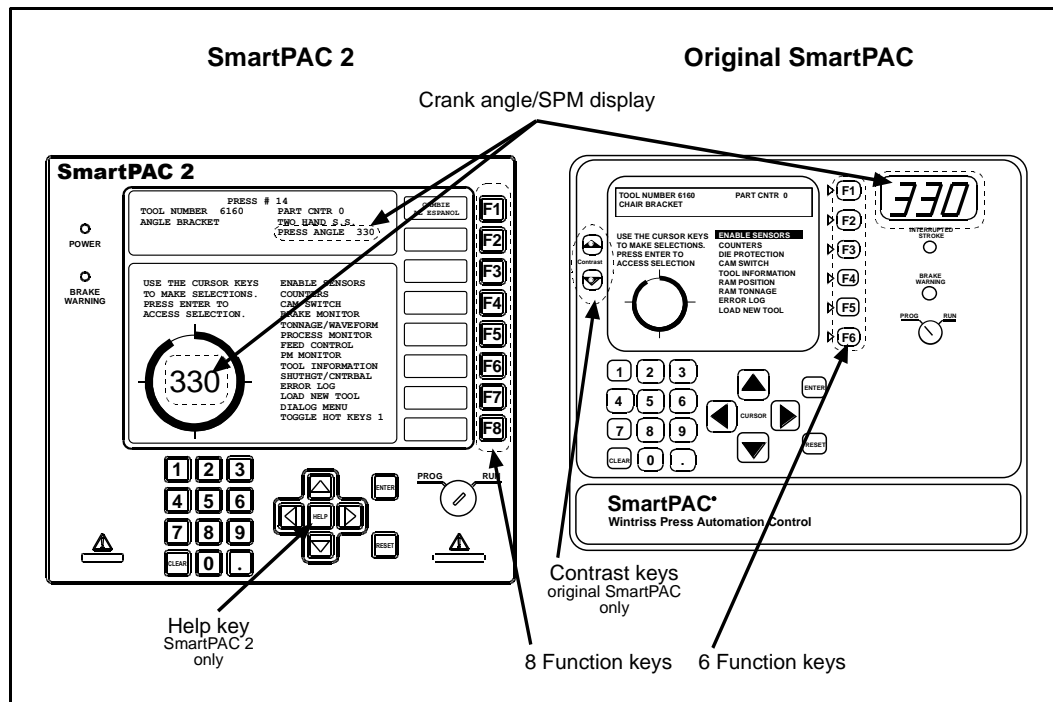
Figure 1-1. SmartPAC 2 and Original SmartPAC

Original SmartPAC, SmartPAC 2, and SmartPAC PRO panel displays use a different number of function, or "F," keys. SmartPAC 2 and SmartPAC PRO have eight function keys, and the original SmartPAC only six. Be sure to read the instructions on the display and the descriptive labels on or next to the function keys before you press an "F" key.

> **NOTICE**
>
> On many screens, you can press the HELP or ? key (see Figure 1-1 and Figure 1-2) to display instructions showing you how to use the screen.

If you need additional help using AutoSetPAC with SmartPAC, SmartPAC 2 or SmartPAC PRO, refer to the appropriate manual.

Original SmartPAC and SmartPAC 2 Front Panels

NOTICE
See *SmartPAC PRO Front Panel,* page 23 for SmartPAC PRO front panel information.

Programming and operation of AutoSetPAC is accomplished via the SmartPAC front panel, Figure 1-1. A brief description of each panel component is below, Table 1-1. Refer to your original SmartPAC or SmartPAC 2 manual for more information.

Table 1-1. Original SmartPAC and SmartPAC 2 Panel Features

Display	Used with the keyboard to make and adjust settings, load tools, and view diagnostic messages. SmartPAC PRO has a touch screen.
Program/Run key switch	Allows Program mode to be locked so settings cannot be changed by the press operator. Key must be set to "Run" to operate the press. Minor adjustments, including loading an existing tool, can be made in Run mode.
Keyboard	Cursor keys and numeric keypad (described below under *Number keys*) are used with the display to make settings.
Cursor keys	Enable you to select a display item with the highlight bar. Also allow you to select alphabetic characters and special symbols when naming the press, tools, cam channels, and sensors.
Number keys	Enable you to input numeric values such as counter presets or tool numbers.
Function keys	Eight keys labelled "F1" to "F8" that perform specific tasks. Functions performed by pressing the key are displayed to the left of the key label. Function keys can also be programmed as "Hot keys" that take the user directly to desired screens.
HELP key	Enables you to access a help screen that provides information about the display you are looking at.
ENTER key	When you press this key, SmartPAC accepts the menu item you have selected or the number you have keyed in.
RESET key	You press this key when you are done with a programming or other procedure. Also resets SmartPAC after fault or event messages appear on the display.

Detailed instructions on how to use the keyboard and display are provided in Chapter 3 of the original SmartPAC and SmartPAC 2 user manual.

SmartPAC PRO Front Panel

NOTICE

See *Original SmartPAC and SmartPAC 2 Front Panels*, page 22, for front panel information on these products.
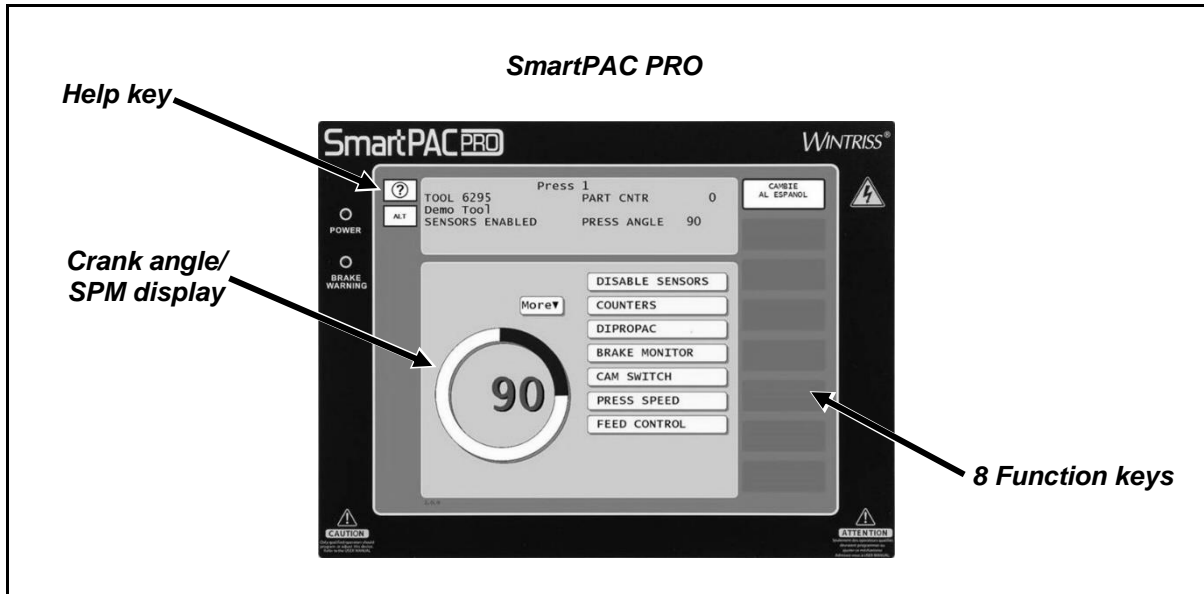
Figure 1-2. SmartPAC PRO
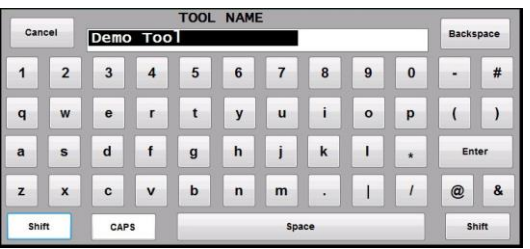
Programming and operation of AutoSetPAC is accomplished via the SmartPAC PRO front panel, Figure 1-2. Refer to your SmartPAC PRO manuals for more information.
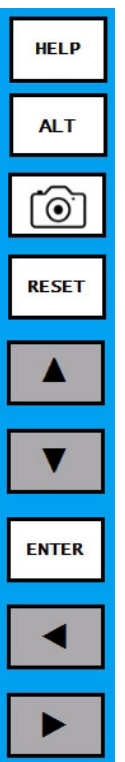
SmartPAC PRO features a touch screen with on-screen buttons to enable you to navigate through its menus and make setting for your tools. In addition, SmartPAC PRO utilizes several different on-screen keypads for entering alpha-numeric data or to navigate through certain "legacy" screens using cursor (arrow) "keys". These keypads are described below, in Table 1-2.

NOTICE

You may plug a USB keyboard into the USB port on the front panel of the SmartPAC PRO. When entering alphanumeric data, the SmartPAC PRO will automatically recognize keystrokes from both the external and on-screen keyboards.

Table 1-2. SmartPAC PRO Panel Features

On-Screen Numeric Keypad	Whenever you select a field that requires numbers only, SmartPAC PRO will display a numeric keypad. The up and down arrow cursor keys on the keypad will increment or decrement the value by 1. The backspace key will clear the value. The Cancel key will close the numeric keypad without making any changes, and the Enter key will accept the value entered into the field. When a USB keyboard is used, the Esc key acts as the Cancel button, while the other keys match their counterparts. Note that when the on-screen keypad is displayed, the "EXIT" key on the screen is disabled. The keypad value must be entered or cancelled before you can access any other buttons on the screen.
On-Screen Keyboard	Whenever you select a field that requires the input of a combination of letters, symbols, and/or numbers, SmartPAC PRO displays its on-screen keyboard. The backspace key will clear the value. The Cancel key will close the numeric keypad without making any changes, and the Enter key will accept the value entered into the field. The Shift key capitalizes the next character, the CAPS key functions like a Caps Lock key. When a USB keyboard is used, the Esc key acts as the Cancel button, while the other keys match their counterparts. Note that when the on-screen keyboard is displayed, the "EXIT" key and any other buttons on the screen behind the keyboard are disabled. The value must be entered or cancelled before you can access any other buttons on the screen.

"ALT" Menu	On certain screens, an alternate navigation menu called the "ALT" menu appears. Typically, the ALT menu is displayed when traditional "Cursor-and-Enter" navigation is used on a screen rather than the touch screen. It consists of the following buttons:	HELP ALT 📷 RESET ▲ ▼ ENTER ◄ ►
	HELP or $\boxed{?}$ – The Help button is active on most screens. As the label implies, this button provides instructions for the specific screen you are viewing.	
	ALT – The ALT button expands and collapses the ALT Menu.	
	Camera –When pressed, the camera icon captures an image of the current screen. See your SmartPAC PRO user manual for more information on the Screen Capture feature.	
	RESET – The Reset button performs a similar function to the EXIT	
	button on the touch screen: It backs you out of the current screen or	
	clears a status message.	
	ENTER – The Enter button is used to select a highlighted item during	
	navigation, or to register a value entered into a field.	
	Cursor (arrow) keys – The cursor keys are used to move the on-screen navigation highlight, to increment and decrement numeric values, and to set the on and off angles for programmable limit switch outputs and die protection ready signals.	

Strain Links

AutoSetPAC receives its tonnage information from strain links, which are mounted to the press frame or other structural members and wired to the load analyzer. Strain links measure the forces acting on the press frame, converting press frame deflection into an electrical signal. This signal is proportional to the load being generated by the press.

Two strain links are used with AutoSetPAC 2-Channel, four strain links with AutoSetPAC 4-Channel. Instructions on how mount and wire strain links are provided in *Installing Strain Links*, page 39. Zeroing strain links is covered in *Zeroing Strain Links*, page 71.

Calibration

AutoSetPAC must be calibrated before use. To calibrate the unit, you first load the press to a known tonnage, using load cells connected to an independent load monitor that you know will give correct readings. You then adjust the tonnage readings on AutoSetPAC until they match the tonnage readings on the independent load monitor. Instructions for calibrating AutoSetPAC are provided in Chapter 3.

AutoSetPAC Operation

AutoSetPAC calculates high, low, and repeatability setpoints automatically based on the setpoint percentage and sample period settings you make for each tool in Program mode (see *Chapter 4*, page 91).

The sample period is the number of strokes during which AutoSetPAC collects tonnage information to use in calculating setpoints. The high setpoint percentage is the percentage above the measured load that AutoSetPAC uses in calculating high tonnage setpoints. The low setpoint percentage is the percentage below the measured load used to calculate low tonnage setpoints. The repeatability percentage is the percent of stroke-to stroke variation in the measured load used to calculate repeatability setpoints.

Setpoint percentage and sample period settings are easily copied from tool to tool using the Copy Tool function.

AutoSetPAC displays the results of its calculations on the Adjust Setpoints screen in Program and Run modes. Setpoints are shown for two channels on AutoSetPAC 2-Channel load analyzers and for four channels on AutoSetPAC 4-Channel units.

During the sample period, setpoints are maintained at 120% of the full-scale capacity of the press to provide overload protection.

NOTICE

AUTOSETPAC SETPOINTS NEVER EXCEED 120%
AutoSetPAC will not create setpoints greater than 120% of the full-scale capacity of the press.

AutoSetPAC calculates new setpoints whenever the RECALCULATE SETPOINTS function is selected in Program or Run mode. Setpoints are displayed after the sample period is completed. AutoSetPAC also calculates new setpoints whenever you change any of the setpoint percentages for a tool.

AutoSetPAC provides reverse load protection based on a specified percentage of press capacity. This parameter is set in Initialization mode (see *Chapter 3*, page 59).

Complete instructions for making settings in AutoSetPAC are provided in *Chapter 4*, page 91.

AutoSetPAC Faults

AutoSetPAC stops the press when the high, low, repeatability, and/or reverse setpoints are exceeded for any of the strain link(s), and SmartPAC displays a fault message on its front panel.

To clear the fault, press the RESET key.

AutoSetPAC fault conditions are covered in *Chapter 6*, page 121.

AutoSetPAC Specifications

AutoSetPAC specifications are shown in Table 1-3.

Table 1-3. AutoSetPAC Specifications

Equipment	Enclosure 10.25" (260.4 mm) x 12" (304.8 mm) x 4" (101.6 mm), NEMA 12, shock-mounted
Power	115 or 230 Vac ±15%, 50-60 Hz, 30 W Or 24 ± 5% Vdc, 0.5 A
Operating temperature	32° to 122° F (0° to 50° C)
Relay contact rating	4 amps @ 120 or 240 Vac Normally open, held closed
Speed	to 2000 SPM
Setpoints	High, low, and repeatability setpoints for peak forward load stored with each tool number High limit % for reverse load (based on press capacity)
Optional display	Two or four 3-digit .43" (10.9 mm) high for tonnages Two or four 3-digit .30" (7.6 mm) high for setpoints One 4-digit .43" (10.9 mm) high for total tonnage (AutoSetPAC 4-Channel display only)
Strain links Size Cable	Two (AutoSetPAC 2-Channel) or four (AutoSetPAC 4-Channel) required 3.75" (95.3 mm) x 1.19" (30.2 mm) x 0.75" (19.1 mm) 30 ft. (9.1m) standard, other lengths optional. Cables with mating connectors for strain links with the Hirschman connector option also available.
Drill jig	One provided

Chapter 2 Installation

NOTICE

WIRING CONNECTIONS FOR AUTOSETPAC WITH ORIGINAL SMARTPAC
Most of the instructions provided in this chapter assume that you are installing AutoSetPAC on a SmartPAC 2 or SmartPAC PRO control. However, if you are connecting your AutoSetPAC to an original SmartPAC, see *Connecting a New AutoSetPAC to Original SmartPAC*, page 51. See the appropriate wiring diagrams at the end of the manual.

NOTICE

"SmartPAC" refers to original SmartPAC, SmartPAC 2, and SmartPAC PRO, unless otherwise indicated.

This chapter shows you how to mount the AutoSetPAC (with or without the optional control enclosure) and make wiring connections for AC power, stop circuits, strain links, zero cam, communications, and other devices. It is organized in the following sections:

Mounting AutoSetPAC

Mounting procedures vary depending on which of the following AutoSetPAC configurations you ordered:

- *Mounting the AutoSetPAC Enclosure without Display*, page 30

- *Mounting the AutoSetPAC Enclosure with AutoSet 2-Channel/4-Channel Display*, page 30

- *Installing the AutoSetPAC Processor Board, 85 to 264 Vac Version (No Enclosure)*, page 31

- *Installing the AutoSetPAC Processor Board (24 Vdc Version)*, page 32

Mounting the AutoSetPAC Enclosure without Display

To mount the standard AutoSetPAC enclosure, follow these steps:

1. Determine a convenient mounting location, considering the following factors:

   • Strain link cables must be capable of reaching the mounting site

   • The mounting location must allow enough room for the door to open at least 120°

   • The enclosure can be mounted to the press or on a free-standing pedestal

2. Drill holes for mounting, referring to Figure 2-1. Tap holes and mount the enclosure, using the enclosed shock mounts. Shock mount studs are 1/4–20. Use a No. 7 drill and 1/4–20 tap.
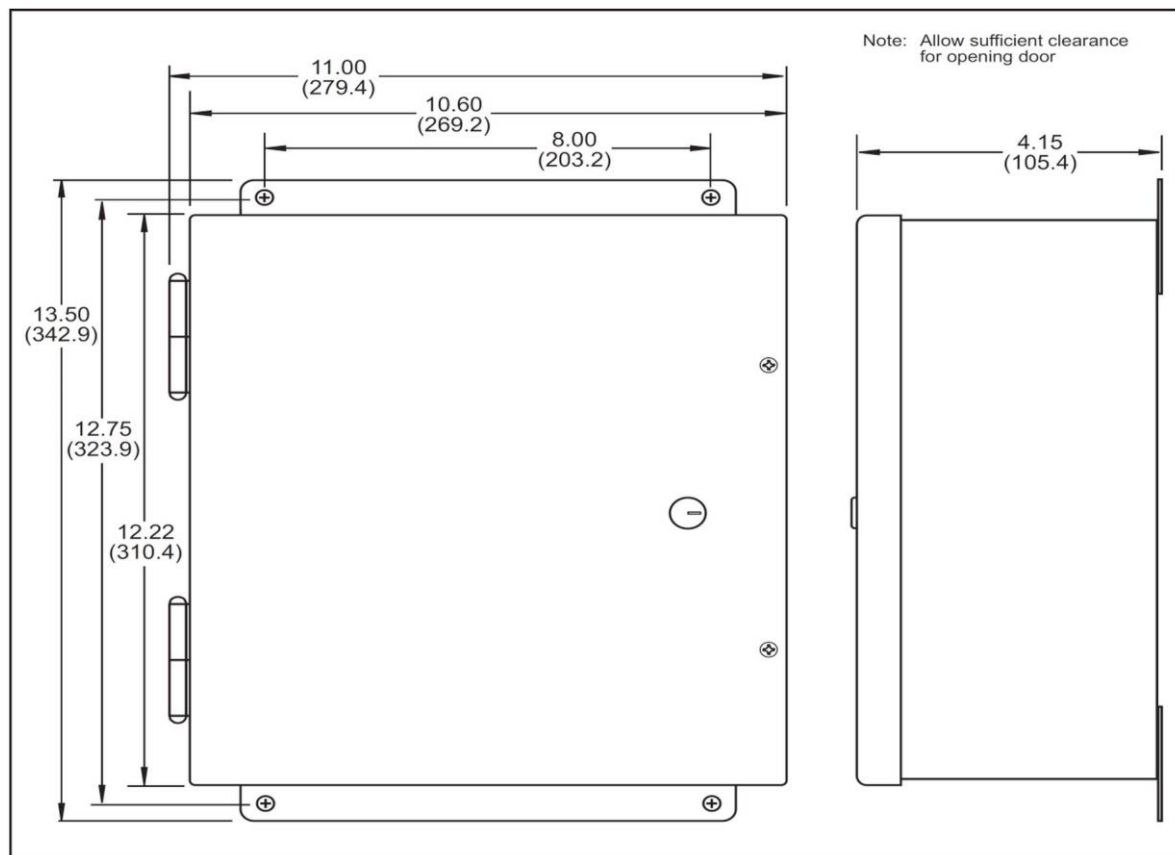
Figure 2-1. AutoSetPAC Enclosure: Mounting Dimensions

Mounting the AutoSetPAC Enclosure with AutoSet 2-Channel/4-Channel Display

To mount the AutoSetPAC enclosure with an AutoSet 2-Channel or 4-Channel display, follow these steps:

1. Determine a convenient mounting location, considering the following factors:

   • The enclosure should be mounted as close as possible to the press control so that operators and setup personnel can easily see the readouts

   • Strain link cables must be capable of reaching the mounting site

- The mounting location must allow enough room for the door to open at least 120°

- The enclosure can be mounted to the press or on a free-standing pedestal

2. Drill holes for mounting, referring to Figure 2-1. (AutoSet 2-Channel and standard AutoSetPAC enclosures have identical dimensions) and Figure 2-2. Tap holes and mount the enclosure, using the enclosed shock mounts. Shock mount studs are 1/4–20. Use a No. 7 drill and 1/4–20 tap.
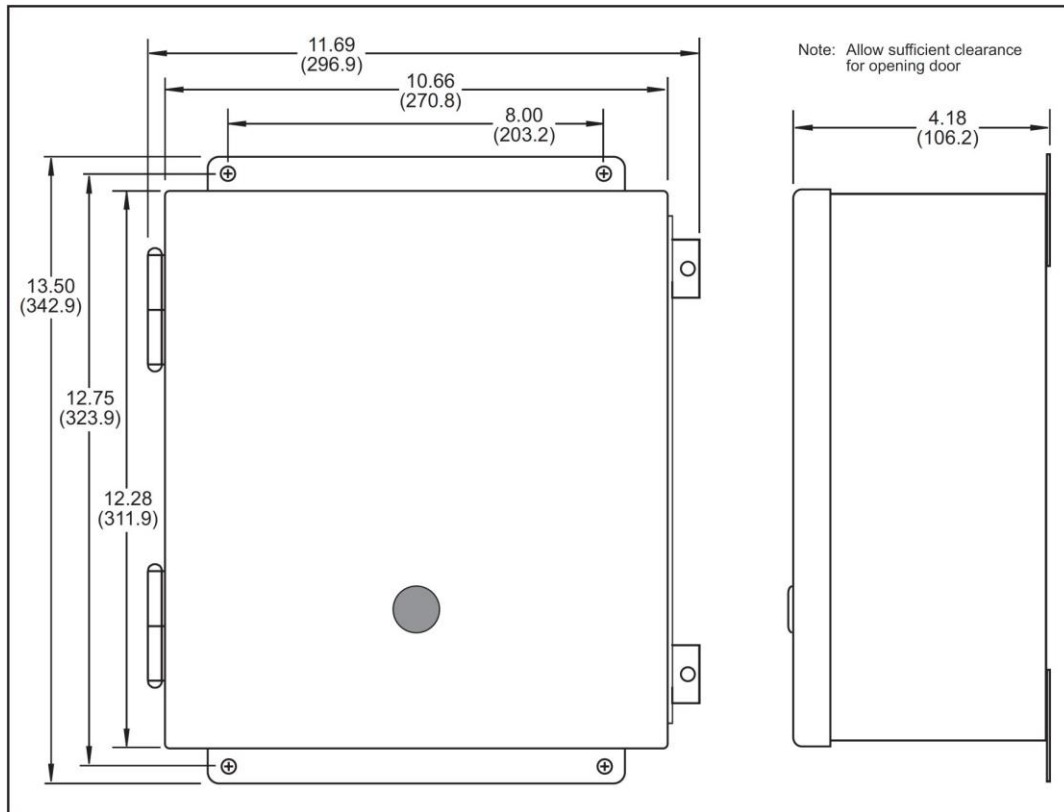
Figure 2-2. AutoSetPAC Enclosure with AutoSet 4-Channel Display: Mounting Dimensions

Installing the AutoSetPAC Processor Board, 115 to 230 Vac Version (No Enclosure)

To mount the AutoSetPAC 2-Channel or 4-Channel processor board in your enclosure, do the following:

1. Determine a convenient, accessible location within your enclosure in which to mount the AutoSetPAC board, allowing enough room for installation and maintenance of the board.

2. Mount the board, using the eight (8) standoffs provided, referring to Figure 2-4 for mounting dimensions. (Figure 2-4 shows the AutoSetPAC 4-Channel board. Dimensions of the 2-Channel board are identical.) Standoffs are 6-32 and 1/2” long. Recommended screw size is 6-32 x 3/8”.
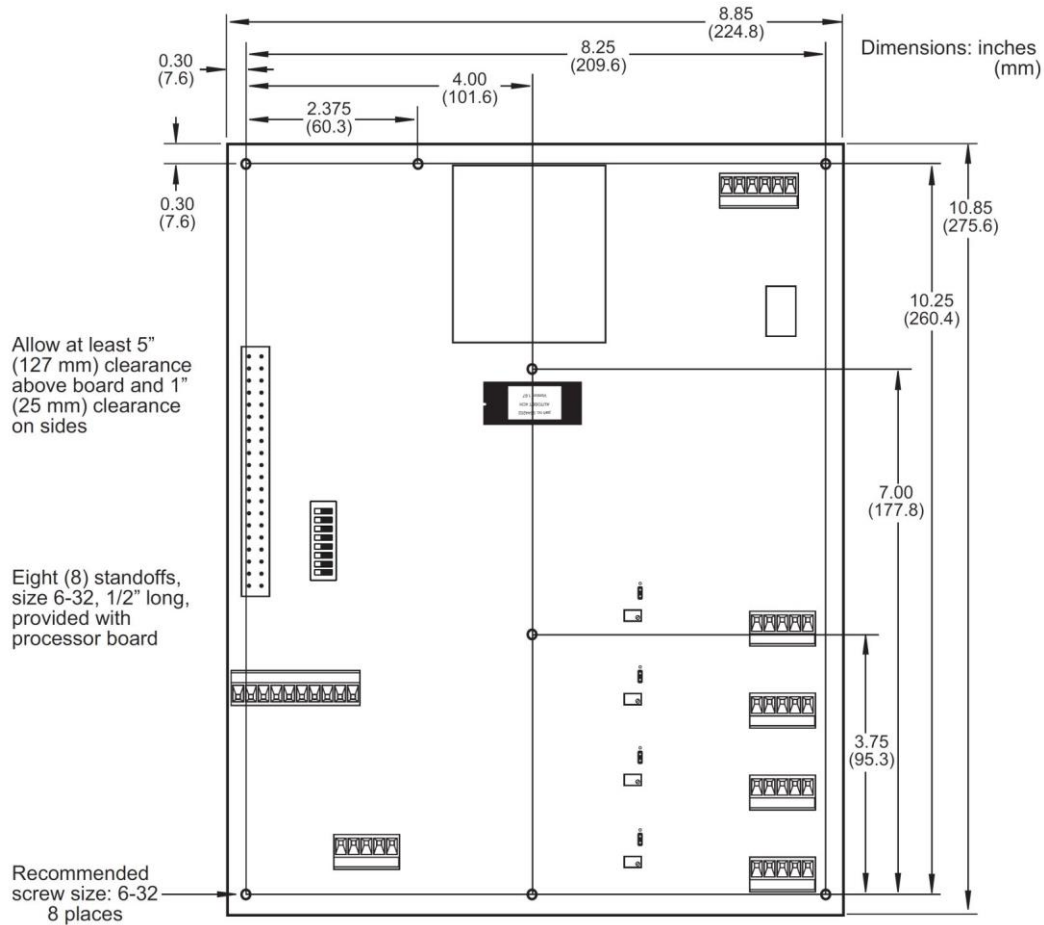
Figure 2-3. AutoSetPAC 4-Channel Processor Board (115 to 230 Vac Version):
Mounting Dimensions

Installing the AutoSetPAC Processor Board (24 Vdc Version)

To mount the board in your enclosure or console, do the following:

1. Determine a convenient, accessible location in which to mount the board, allowing enough room for installation and maintenance.

2. Mount the board, using the four (4) standoffs provided, referring to Figure 2-5 for mounting dimensions. Standoffs are 6-32 and 1/2 in. long. Recommended screw size is 6-32 x 3/8 in.
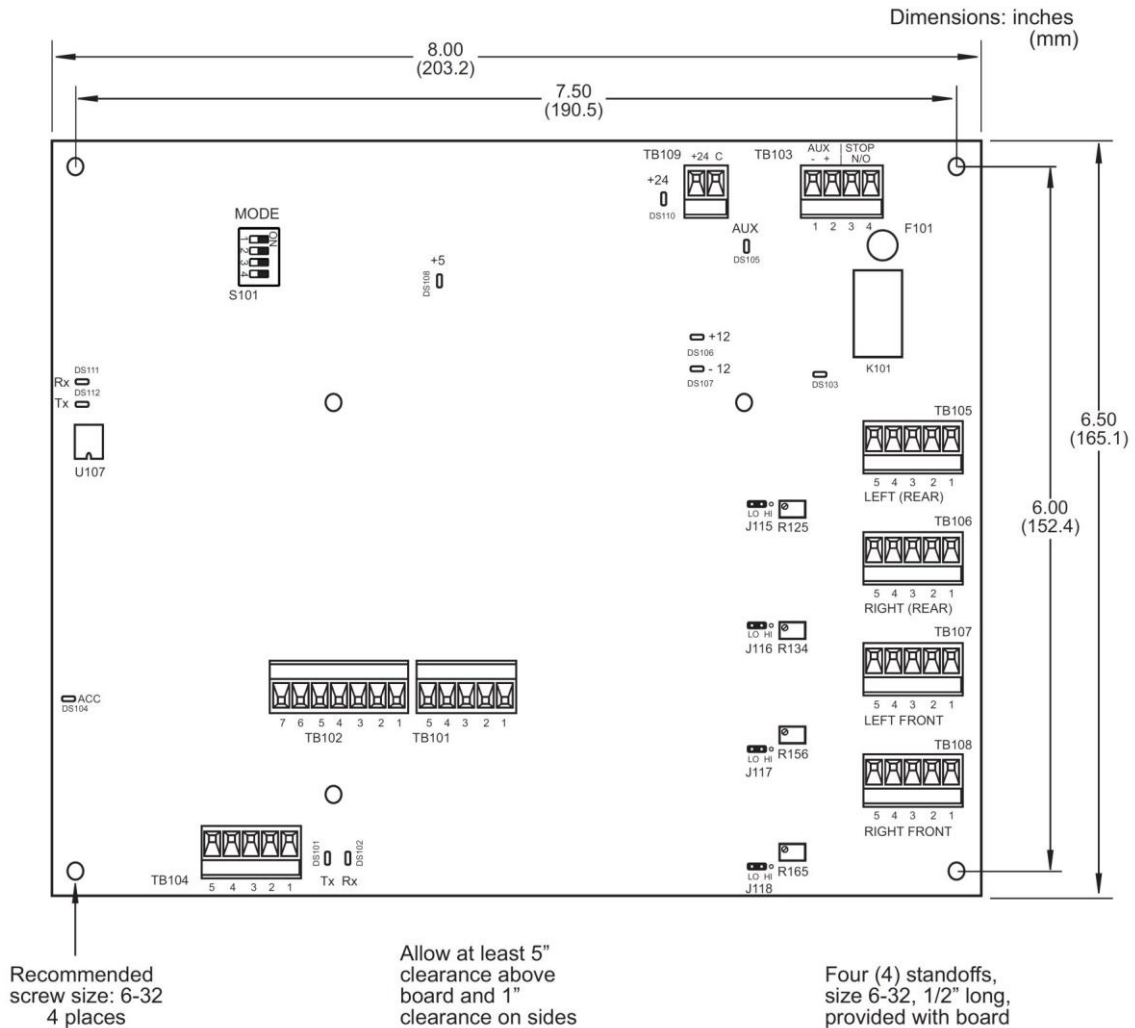
Figure 2-4. AutoSetPAC Processor Board (24 Vdc Version): Mounting Dimensions

Connecting AC and Stop Circuit Wiring

Wiring connections for AC power and stop circuits are made on terminal block TB103, which is located at the upper right of the AutoSetPAC processor board (see Figure 2-6, page 35, or Figure 2-7, page 36). To make wiring connections, do the following:

⚠ WARNING

ELECTRIC SHOCK HAZARD

- Do not connect the AC power source until you complete all other installation procedures.
- Turn off and disconnect power from the machinery AutoSetPAC is connected to before making any wiring connections. This includes power to the machine control and motor.

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

NOTICE

24 VDC VERSION WIRING DIAGRAMS

If you have the 24 Vdc version AutoSetPAC, follow the instructions in the appropriate wiring diagrams at the end of this manual: Figures 6 and 7 for SmartPAC 2 or Figures 11 and 12 for SmartPAC PRO.

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1. Determine how you will bring wiring from your 115 or 230 Vac power source to the control enclosure. For 115 Vac, you need three wires—black (High), white (Neutral), and green (Ground). For 230 Vac, wires are black (High), red (Neutral), and green or green/yellow (Ground). No. 16 wire is recommended; use No. 14 if local codes require it.

NOTICE

AutoSetPAC must be wired into the stop circuit on the press. Otherwise, SmartPAC cannot stop the press if AutoSetPAC detects a tonnage fault.

Wintriss recommends you connect AutoSetPAC to the top-stop rather than to the E-stop circuit of your press to prevent the press from sticking on the bottom if an overload occurs.

Top-stop circuits are active only in Continuous (automatic) operations on most press controls. If overload protection is required during Inch or Single-stroke mode, you may have to install an additional relay so that AutoSetPAC can stop the press.

---

2. Determine how you will connect the wires from AutoSetPAC to your press control stop circuit. You need two wires. No. 16 is recommended; use No. 14 if local codes require it. Wires should be connected to the top-stop circuit to prevent the press from sticking on the bottom of its stroke when AutoSetPAC stops the press due to an overload.

3. Open the control enclosure or console and locate the 115V-230V voltage selector switch (S110) in the upper right corner of the AutoSetPAC processor board (see Figure 2-6 or Figure 2-7). Set the switch to 115 V, the factory setting. If your AutoSetPAC will be used with 230 Vac, push the switch to the "230V" position, using a fingernail or a screwdriver.

4. Run the power and stop circuit wires through flexible liquid tight conduit to AutoSetPAC. If you have an enclosure, it is rated NEMA 12 (protected against dust and oil). Use conduit of the same rating and make proper connections to ensure NEMA 12 protection. Wires go through top right knockout. Leave a small service loop inside the enclosure.
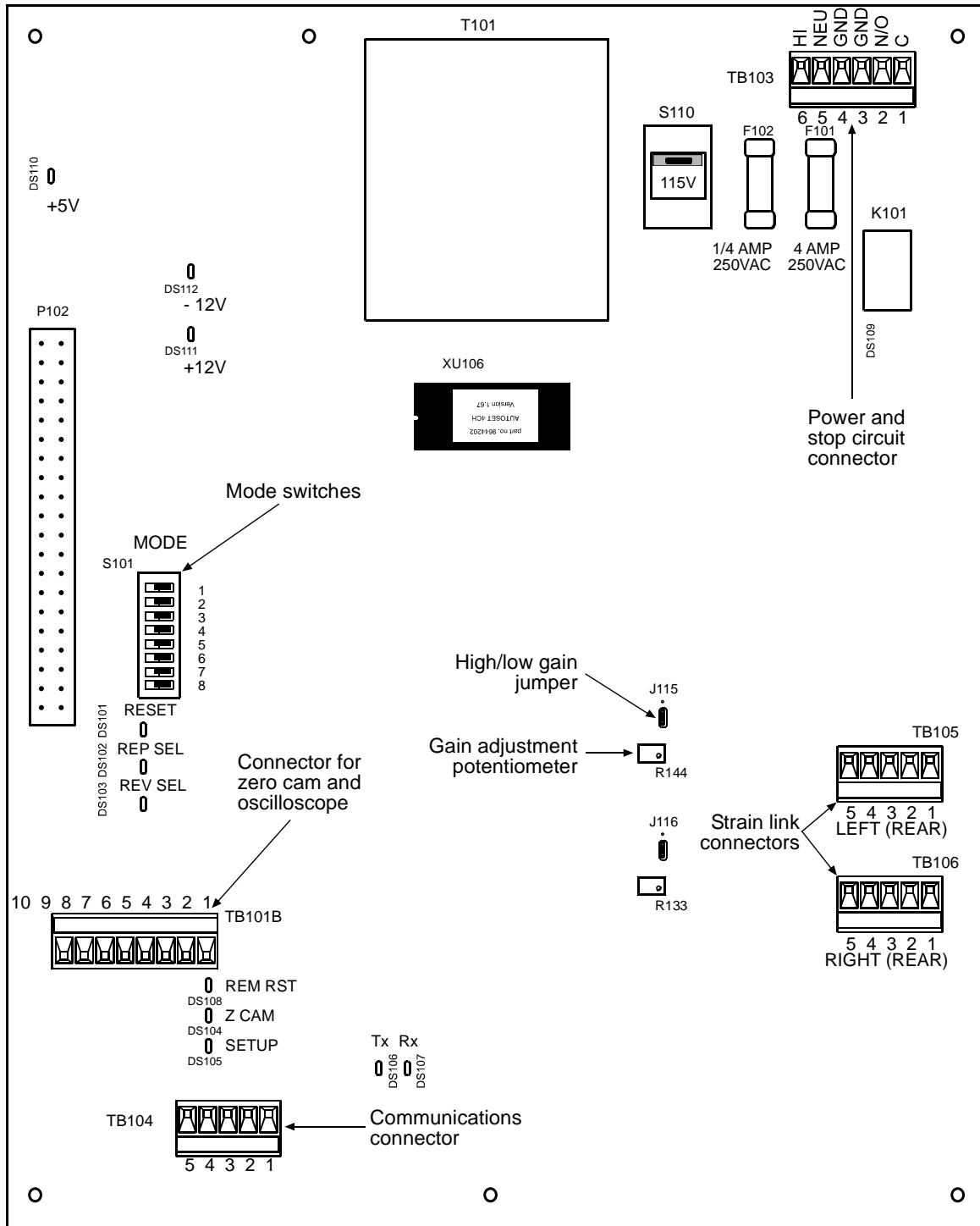
Figure 2-5. AutoSetPAC 2-Channel Processor Board: Location of Important Components
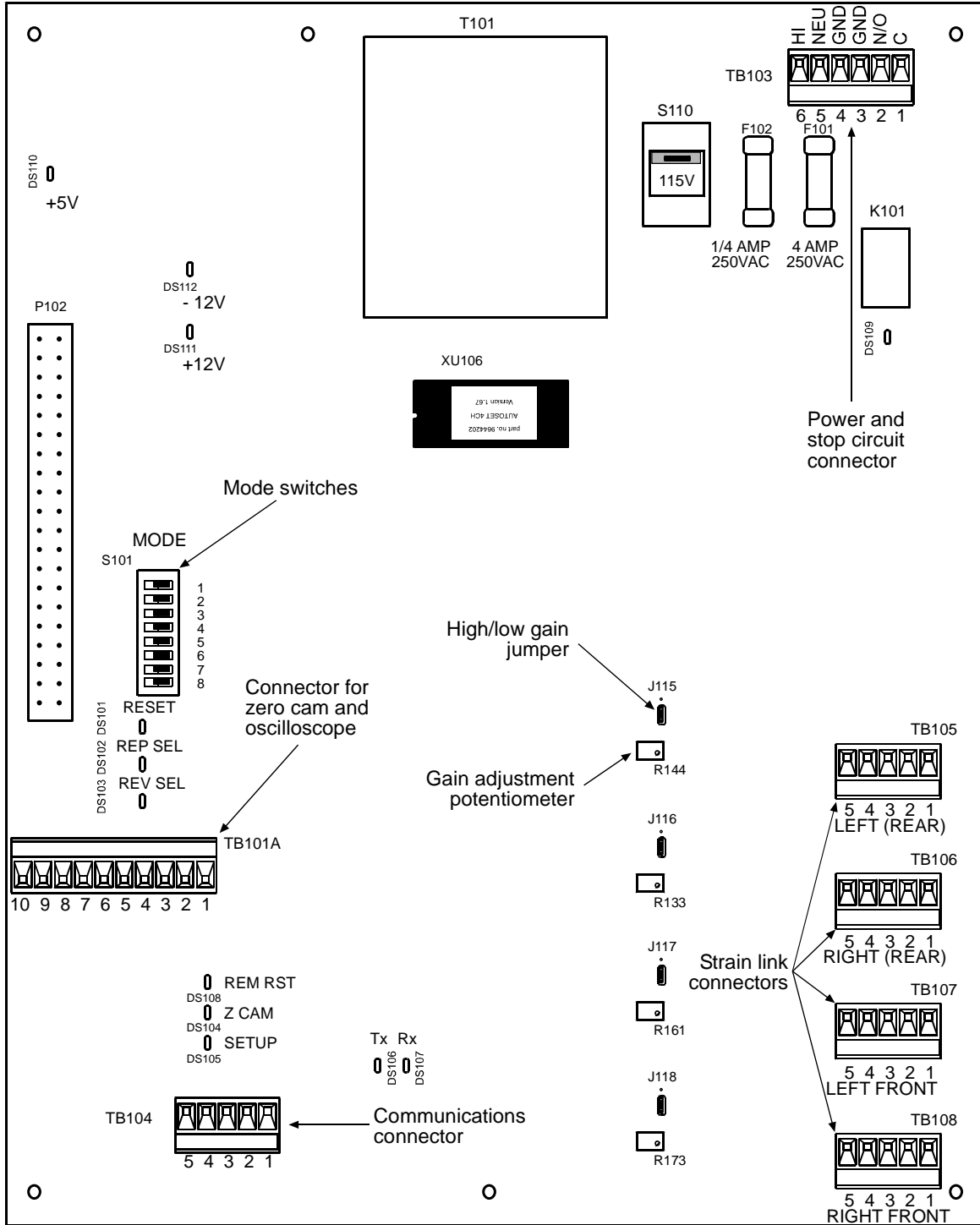
Figure 2-6 AutoSetPAC 4-Channel Processor Board: Location of Important Components.

5. Connect the ground (green or green/yellow) wire to the ground stud on the ceiling at the top right of the enclosure, as shown in Figure 2-8. To make the connection, strip the ground wire about 1/4" (6.4 mm) from the end, loosen the screw on the ground stud, slide the wire into the hole, and tighten the screw to pin the wire in place.
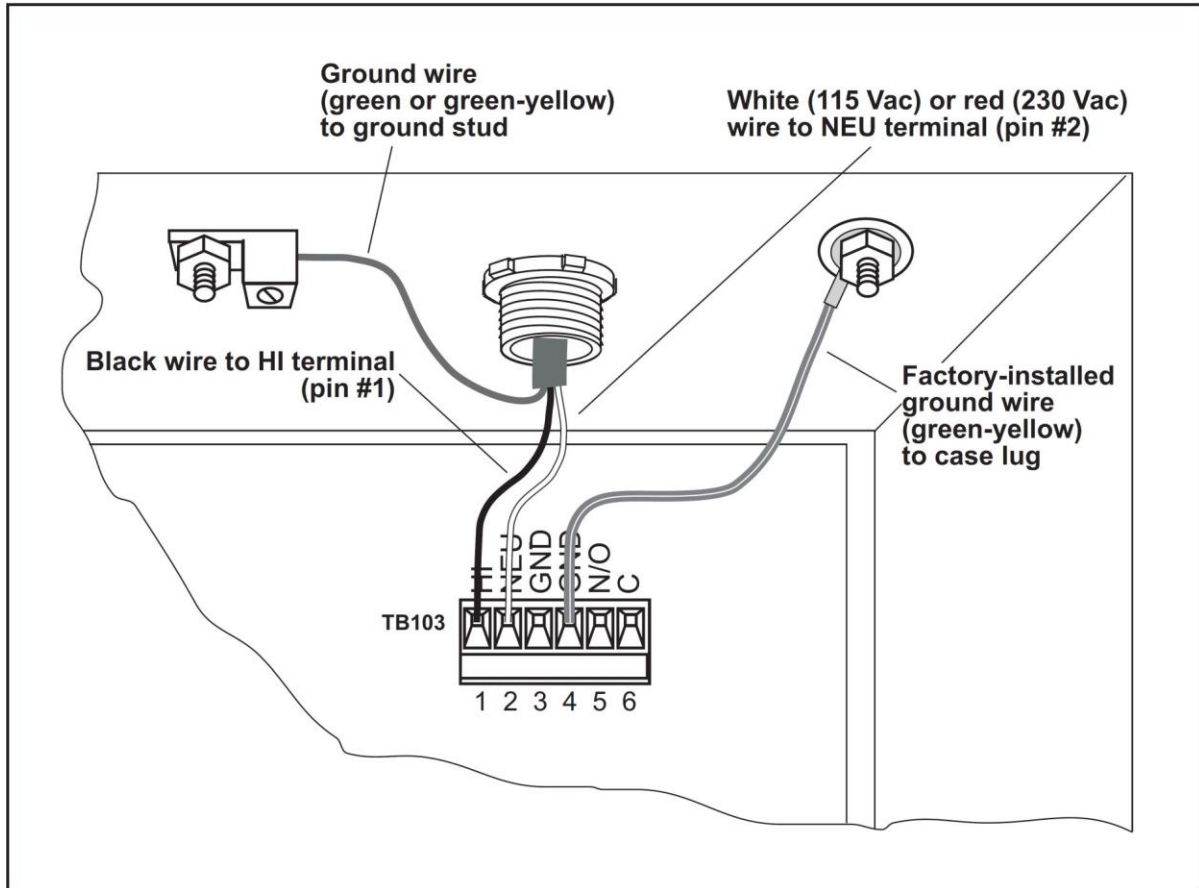
Figure 2-7. AC Power Connections

6. Remove the connector from terminal block TB103 at the top right of the AutoSetPAC processor board, and connect the remaining AC wires as shown in Figure 2-8 and Table 2-1, page 38.

NOTICE

A ground wire is attached from pin #4 on the TB103 connector to a case lug, as shown in Figure 2-8. It is recommended that you not remove this wire while making connections, but if you do, make sure to reconnect it when you are done.

Table 2-1. AutoSetPAC AC Power and Stop Circuit Wiring Connections, TB103

Pin #	Label		Function	Wire Color *
1	HI	(L1)	AC power	Black
2	NEU	(L2)	AC power	White (115 VAC), Red (230 VAC)
3	GND	(GND)	Not used	Not used
4	GND	(CHAS)	Chassis ground	Connected to case lug
5	N/O	(STOP)	Stop circuit	N.A.
6	C	(STOP)	Stop circuit	N.A.

* Ground wire (green or green/yellow) should be connected to ground stud on ceiling of enclosure.

Table 2-2. AutoSetPAC 24 VDC Power Wiring Connections, TB109

Pin #	Label	Wire Color *
1	+24	RED
2	GND	WHITE

Table 2-3. AutoSetPAC 24 VDC Stop Circuit Wiring Connections, TB103

Pin #	Label	Wire Color *
3	STOP	N/A
4	STOP	N/A

7. Connect the press control stop circuit wires to the TB103 connector, as shown in Table 2-1.
    Either wire can be connected to either pin.

NOTICE

WIRING FOR WINTRISS CLUTCH/BRAKE CONTROL

If you are wiring the AutoSetPAC stop circuits to a WPC II, WPC 1000, or WPC 2000 clutch/brake control, connect the wire from pin #6 on TB103 on the AutoSetPAC processor board to terminal #79 on the WPC processor board and the wire from pin #5 on TB103 to terminal #80 on the WPC board.

NOTICE

The TB103 connector can plug in only one way. Make sure that you do not start at the wrong end when connecting AC or stop circuit wires. Check your wiring against the labels stamped on the processor board, holding the connector against the terminal block the way it will plug in.

---

8. Plug the connector back into the TB103 terminal block. Double-check connections, referring to the labels stamped on the board.

9. Make all necessary conduit connections to ensure NEMA 12 protection.

10. Do not connect wires to the AC power source until you are done with all other installation procedures. Also make sure to number all wires in a way consistent with your press's electrical prints.

⚠ WARNING

ELECTRIC SHOCK HAZARD

Do not connect AC wires to the power source until all other installation procedures have been completed.

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

Installing Strain Links

Two (AutoSetPAC 2-Channel) or four (AutoSetPAC 4-Channel) differential strain links are provided with your AutoSetPAC load analyzer. Part numbers and corresponding cable lengths or connector type for both standard and metric strain links are shown in Table 2-4.

Table 2-4. Strain Link Part Numbers with Cable Length or Connector Type

Part Number: Standard	Part Number: Metric	Cable Length or Connector Type
9647101	9647301	30 ft. cable
9647102	9647302	100 ft. cable
9647201	9647305	Hirschman connector

If you plan to use other strain links, contact Wintriss Tech. Support to make sure they are compatible with your AutoSetPAC unit.

Mounting Strain Links

To mount strain links, perform the following steps, referring to Figure 2-9 for mounting dimensions
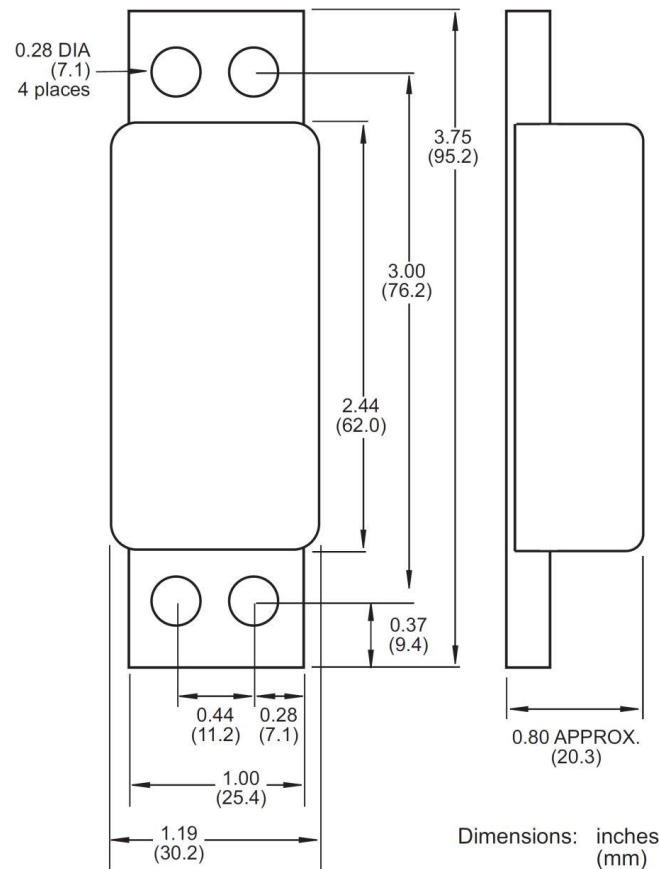
Figure 2-8. Strain Link: Mounting Dimensions

1. Select locations on the press where you plan to mount the strain links.

    On gap-frame (OBI or OBG) presses, strain links can be mounted on the front, where they measure tension, or on the rear, where they measure compression (see Figure 2-10). The rear-mounting option is often preferred because the strain links are away from the work area.

    On straight side presses, strain links are typically mounted on both front and rear; they measure tension, or stretching, of the frame. On 2-channel AutoSetPACs, strain links are mounted diagonally–for example, one on the left front, one on the right rear (see Figure 2-11). On 4-channel units, strain links are mounted on all four corners.

    Sand down the frame's surface to remove all paint or plastic filler, which will affect strain link readings. Cast frames may need light grinding to provide a flat surface.

NOTICE

STRAIN LINKS MUST BE MOUNTED ON A FLAT SURFACE

Make sure there are no imperfections, ridges, or cavities on the mounting surface. If strain links are not mounted on a flat surface, they will be difficult or impossible to zero. Irregular surfaces also cause inaccurate tonnage readings.

⚠ WARNING

Use caution when determining an appropriate location for each strain link! Do not mount any strain link on the press column above or below a hole 1" in diameter or larger. Avoid mounting strain links inside the die area where they will be subjected to harsh chemicals. If necessary, use a cover to protect strain links.
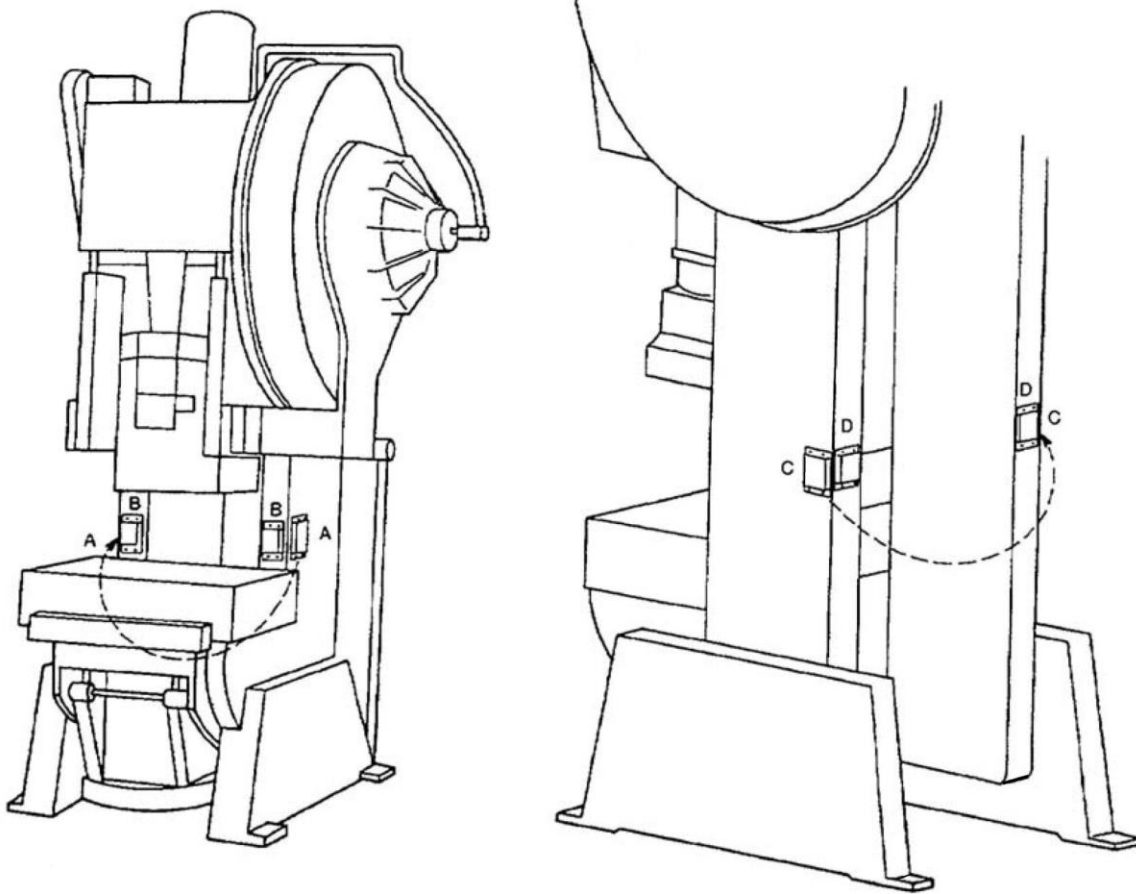
Front-mounting: strain links measure tension
A–Mounting locations on front sides of press
B–Mounting locations on front face of press

Rear-mounting: strain links measure compression
C–Mounting locations on rear sides of press
D–Mounting locations on rear face of press

Figure 2-9. Strain Link Mounting Options on Gap-frame Presses
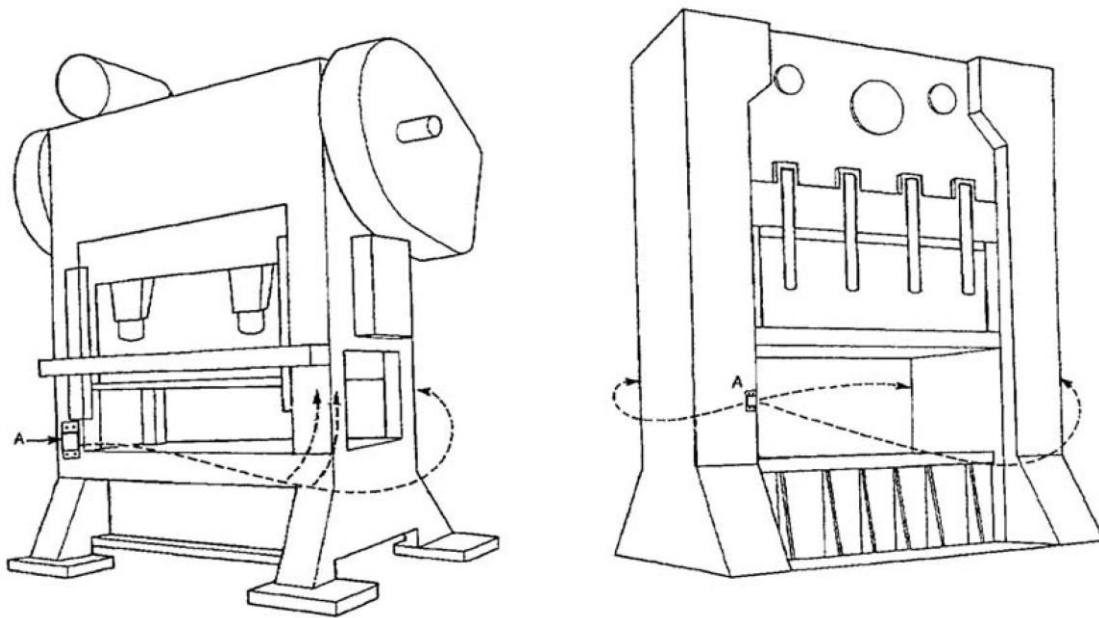
Column-mounting: strain links measure tension
A–Mounting locations on front and rear of press (either face or sides)
    2-channel: strain links mounted diagonally (e.g., left front, right rear)
    4-channel: strain links mounted on all four corners

Figure 2-10. Strain Link Mounting Options on Straight-side Presses

2. Select the area for the first mounting hole. Using a No. 7 drill bit, drill the hole 1/2" deep and
    bottom tap for a 1/4 x 20 thread.

NOTICE

DRILLING AND TAPPING FOR METRIC SCREWS
If you are installing metric strain links, use a 5 mm drill bit, drill the hole 12 mm deep, and tap with
an M6X1 thread.

NOTICE

When drilling, make sure the holes are at right angles to the surface. The strain link will not work
properly if the mounting holes are cocked or angled.

---

3. Mount the drill jig supplied with the strain links (see Figure 2-12 for mounting dimensions), first
    aligning the large hole in the jig with the mounting hole you have just drilled and tapped, then
    securing the jig to the press frame with the long mounting screw. (The four shorter screws are
    used to mount the strain link).
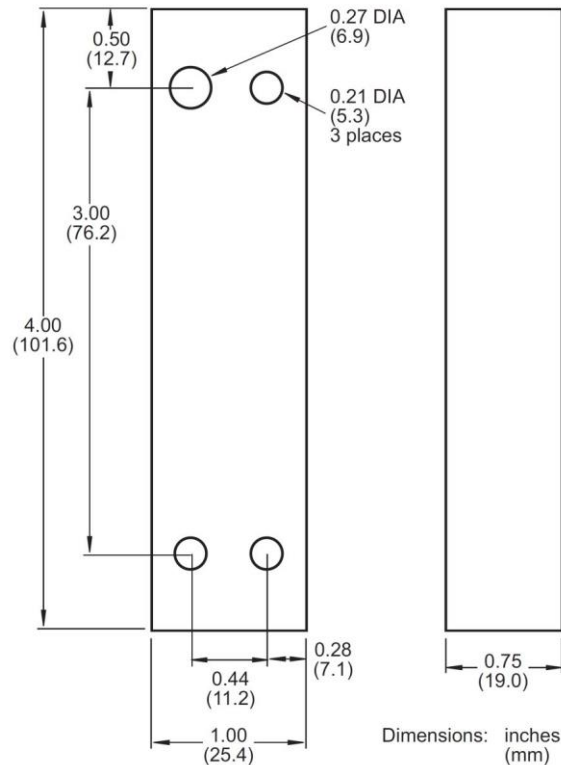
Figure 2-11. Strain Link Drill Jig: Mounting Dimensions

NOTICE

INSTALLING METRIC STRAIN LINKS

If you are installing metric strain links, the drill jig includes both a metric and a standard 1"-long screw. The metric screw is M6X1 and is easily identified because it is made of stainless steel and has more threads (25 vs. 20). The standard screw is 1/4-20.

---

4. Using the three smaller holes in the drill jig as guides, drill the three remaining mounting holes. Drill the holes 1/2" deep, using a No. 7 drill bit.

5. Remove the drill jig, and tap the three holes. Bottom tap for a 1/4 x 20 thread.

6. Mount the strain link loosely on the press, using the four shorter mounting screws.

NOTICE

STRAIN LINKS SHOULD BE MOUNTED LOOSELY

Do not tighten the screws on the strain links. The strain links are tightened down during the strain link zeroing procedure (see *Zeroing Strain Links*, page 71).

---

7. Repeat steps 2 through 6 for the remaining strain links.

8. Tag each strain link cable to identify its position on the press.

    - For 2-channel AutoSetPACs, identify strain links as "Left" and "Right"

    - For 4-channel units, label strain links as "Left Front," "Right Front," "Left Rear," and "Right Rear"

Wiring Strain Links

To wire strain links, perform the following steps:

1. Run the strain link cables through flexible, liquid-tight conduit to AutoSetPAC. If you ordered an enclosure, it is rated NEMA 12 (protected against dust and oil). You must use conduit of the same rating and make proper connections to ensure NEMA 12 protection. Wires go through the bottom right knockout on the enclosure.


NOTICE

Do not run strain link wires through the same conduit as power wires. Strain link wires are sensitive to electrical noise. Separate conduits will provide protection against noise.

---

2. Measure cable to length, making sure each cable reaches the appropriate connector on the AutoSetPAC processor board (see Table 2-5) and allowing for a service loop inside the enclosure; then, cut the cable.

Table 2-5. Strain Link Connections on AutoSetPAC Processor Board

Terminal Block Connector	Strain Link Connections: AutoSetPAC 2-Channel	Strain Link Connections: AutoSetPAC 4-Channel
TB105	Left	Left Rear
TB106	Right	Right Rear
TB107	Not used	Left Front
TB108	Not used	Right Front

3. Strip the outer cable 1" to 2" (25.4 to 50.8 mm) from the end so you can easily separate and work with individual wires, then strip wires 1/4" (6.4 mm) from the end.

4. Remove one of the strain link connectors (TB105 through TB108), referring to Table 2-5.

CAUTION

INCORRECT WIRING CAN DAMAGE STRAIN LINKS
Make sure to connect the black and red wires to the correct terminals as shown in Table 2-6 or Table 2-7, page 45. If you reverse the wiring, the strain link can be damaged.

Failure to comply with these instructions could result in property damage

---

5. Wire the connector, as shown in Table 2-6 or Table 2-7. If you mounted the strain links to read tension, refer to Table 2-6. If you mounted the strain links to read compression, refer to Table 2-7. Make sure to connect the cable shield to the ground stud on the enclosure nearest the knockout through which you bring the strain link wiring, as shown in Figure 2-13, page 45.

Table 2-6. Strain Link Wiring Connections, TB105 - TB108: Tension

Pin #	Wire Color *	Function
1		Unused
2	Green	Input −
3	White	Input +
4	Black	Ground
5	Red	Exc +

* Shield should be connected to ground stud on enclosure
nearest entry of strain link wiring.

Table 2-7. Strain Link Wiring Connections, TB105 - TB108: Compression

Pin #	Wire Color *	Function
1		Unused
2	White	Input −
3	Green	Input +
4	Black	Ground
5	Red	Exc +

* Shield should be connected to ground stud on enclosure
nearest entry of strain link wiring.

6. When you have finished wiring the connector, plug it back into the terminal block from which you removed it. The connector goes in only one way. Double-check connections.

7. Wire the remaining strain link cables, repeating steps 4 through 6.
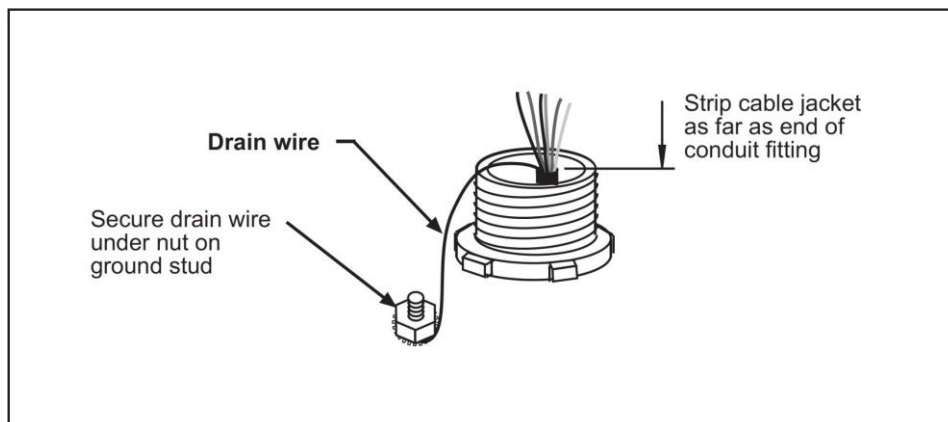
Figure 2-12. Shield Drain Wire Connected to Ground Stud on Enclosure

Connecting the Zero Cam Signal to SmartPAC 2 or SmartPAC PRO

NOTICE

WIRING CONNECTIONS FOR AUTOSETPAC WITH ORIGINAL SMARTPAC
If you are connecting a new AutoSetPAC to an original SmartPAC, see *Connecting a New AutoSetPAC to Original SmartPAC*, page 51, and the appropriate wiring diagrams at the end of the manual.

A "zero cam" is a cam switch that sends a signal to AutoSetPAC near the beginning of each stroke. This signal, which is called the zero signal, turns on at a crankshaft angle of 240° and turns off at an angle of 30°. The zero signal clears, or "zeroes," the tonnage reading on each stroke and prevents AutoSetPAC from registering any tonnage events within the zero cam window. The zero cam ensures that AutoSetPAC records press tonnage occurring near the bottom of the stroke and not tonnage events associated with the beginning or end of the stroke.

The zero cam window also enables AutoSetPAC to determine what proportion of the tonnage recorded on each stroke is being produced by expansion of the press frame as the press heats up during the day and to correct the displayed tonnage accordingly.

The zero signal in AutoSetPAC is provided by SmartPAC. To make wiring connections for this zero signal, refer to the tables and steps below.

Table 2-8. Zero Cam Wiring Connections to SmartPAC PRO

	AutoSetPAC				
	120 VAC		**24 VDC**		
Connection	**2-Channel TB101B Pin#**	**4-Channel TB 101(A) Pin#**	**2-Channel TB102 Pin#**	**4-Channel TB 102 Pin#**	**SmartPAC PRO TB5 Pin#**
Zero	2	2	2	2	248
Gnd	5	10	7	7	250
Wiring Diagram	Figure 8	Figure 9	Figure 12	Figure 11	

* Connect cable shield to ground stud on enclosure nearest entry of wiring.

Table 2-9. Zero Cam Wiring Connections to SmartPAC 2

	AutoSetPAC				
	120 VAC		**24 VDC**		
Connection	**2-Channel TB101B Pin#**	**4-Channel TB 101(A) Pin#**	**2-Channel TB102 Pin#**	**4-Channel TB 102 Pin#**	**SmartPAC 2 TB107 Pin#**
Zero	2	2	2	2	248
Gnd	5	10	7	7	250
Wiring Diagram	Figure 1	Figure 2	Figure 7	Figure 6	

* Connect cable shield to ground stud on enclosure nearest entry of wiring.

1. Locate the terminal blocks noted in the tables above: TB5 on SmartPAC PRO board, TB107 on the SmartPAC 2 board.

   Locate terminal block TB101B on the AutoSetPAC 2-Channel processor board (see Figure 2-6) or TB101(A) on the AutoSetPAC 4-Channel board (see Figure 2-7).

CAUTION

DO NOT combine low and high voltage wiring in the same conduit.

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

---

2. Run the single-conductor zero cam wiring through flexible, liquid-tight, low-voltage conduit from SmartPAC to AutoSetPAC. If you have SmartPAC and AutoSetPAC enclosures, they are rated NEMA 12 (protected against dust and oil). You must use conduit of the same rating and make proper connections to ensure NEMA 12 protection. Wiring goes through the bottom right knockout on the SmartPAC enclosure and through the bottom left knockout on the AutoSetPAC enclosure.

3. Connect each end of the zero cam wire to the pins shown in Table 2-8, referring also to Figure 2-6 or Figure 2-7 and to Figure 1 or 2 (SmartPAC 2) or Figure 8 or 9 (SmartPAC PRO) at the back of the manual.

Connecting Communications Wiring to SmartPAC 2 or SmartPAC PRO

NOTICE

WIRING CONNECTIONS FOR AUTOSETPAC WITH ORIGINAL SMARTPAC
If you are connecting a new AutoSetPAC to an original SmartPAC, see *Connecting a New AutoSetPAC to Original SmartPAC*, page 51, and the appropriate wiring diagrams at the end of the manual.

To connect communications wiring from your version SmartPAC to AutoSetPAC, do the following:

1. Locate terminal block on the SmartPAC 2 (TB103) or SmartPAC PRO (TB6) board and terminal block TB104 on the AutoSetPAC processor board (see Figure 2-6 for AutoSetPAC 2-Channel or Figure 2-7 for AutoSetPAC 4-Channel).

Table 2-10. Communications Wiring Connections

Wire color	AutoSetPAC 2-Channel 120 VAC, 24VDC TB 104		AutoSetPAC 4-Channel 120 VAC, 24 VDC TB 104		SmartPAC PRO TB6		SmartPAC 2 TB103	
	Pin#	**Signal**	**Pin#**	**Signal**	**Pin#**	**Signal**	**Pin#**	**Signal**
BLK	1	SHLD	1	SHLD	240	GRD	240	GRD
ORG	2	+TXD	2	+TXD	241	+RXD2	241	+RXD2
BRN	3	-TXD	3	-TXD	242	-RXD2	242	-RXD2
RED	4	+RXD	4	+RXD	243	+TXD2	243	+TXD2
GRN	5	-RXD	5	-RXD	244	-TXD2	244	-TXD2
120 VAC	Figure 1 or 8		Figure 2 or 9		Figure 8 or 9		Figure 1 or 2	
24 VDC	Figure 7 or 12		Figure 6 or 11		Figure 11 or 12		Figure 6 or 7	

2. Run the five-conductor shielded communications cable through flexible, liquid-tight, low-voltage conduit from your SmartPAC to AutoSetPAC. If you have SmartPAC and AutoSetPAC enclosures, they are rated NEMA 12 (protected against dust and oil). You must use conduit of the same rating and make proper connections to ensure NEMA 12 protection. Wiring goes through the bottom right knockout on the SmartPAC enclosure and through the bottom left knockout on the AutoSetPAC enclosure.

3. Make communications wiring connections as shown in Table 2-10, above, referring also to Figure 2-6 or Figure 2-7 and to the appropriate wiring diagram at the back of the manual. Use one of the Wintriss cables listed in the table below.

Cable Length	Wintriss Part Number
30 feet (9.1 m)	4328501
100 ft (30.5 m)	4328502

Make sure to connect the cable shield to the ground stud on the enclosure nearest the knockout through which you bring the communications wiring, as shown in Figure 2-13, page 45.

4. Verify that switch 6 on Mode switch block S101 on the AutoSetPAC processor board is set to the OFF position, its default setting (see Figure 3-1, page 60).

NOTICE

If you connect a second AutoSetPAC to SmartPAC 2 or SmartPAC PRO, you must set switch 6 on S101 on the second AutoSetPAC board to the ON position. This setting identifies the second AutoSetPAC to SmartPAC (see Figure 3-1, page 60).

Wiring an Oscilloscope (Optional)

You can connect an oscilloscope to the AutoSetPAC load analyzer to view tonnage waveforms produced at each strain link. The AutoSetPAC outputs for this function are -4.688 to +4.688 Vdc.

At 120% of press capacity, output of each strain link is 4.688 Vdc. Output is ratiometric, so at 100% of press capacity, output of each strain link is 3.907 Vdc.

For example, for an AutoSetPAC 4-Channel+ unit with press capacity of 100 tons, the output for each strain link is 3.907 Vdc at 25 tons of load, 1.563 Vdc at 10 tons, etc.

Follow these steps to connect an oscilloscope.

1. Locate terminal block TB101B (120 VAC AutoSetPAC 2-Channel) or TB101(A) (120 VAC AutoSetPAC 4-Channel) on the AutoSetPAC processor board, referring to Figure 2-6 or Figure 2-7.

2. Run wiring from the oscilloscope through flexible, liquid-tight conduit to the bottom left knockout on the AutoSetPAC enclosure or to the appropriate location on your console. Measure and cut the cable so it reaches TB101, TB101B or TB101(A) easily.

   The optional AutoSetPAC enclosure is rated NEMA 12 (protected against dust and oil). If you have an AutoSetPAC enclosure, you must use conduit rated NEMA 12 and make proper conduit connections to ensure NEMA 12 protection.

3. Remove the connector from the TB 101, TB101B or TB101(A) terminal block, and connect wiring for the oscilloscope as shown in Table 2-11 or Table 2-12. On AutoSetPAC 2-Channel models connect three wires, one for each of the two strain links and one for ground. On AutoSetPAC 4-Channel units, connect five wires, one for each of the four strain links and one for ground.

Table 2-11. Oscilloscope Wiring Connections, 120 VAC AutoSetPAC

AutoSetPAC 120 VAC Model	Terminal Block	Pin #	Label
2-Channel	TB101B	5	Ground
		6	Channel 1 (Left Rear)
		7	Channel 2 (Right Rear)
4-Channel	TB101(A)	6	Channel 1 (Left Rear)
		7	Channel 2 (Right Rear)
		8	Channel 3 (Left Front)
		9	Channel 4 (Right Front)
		10	Ground

Table 2-12. Oscilloscope Wiring Connections, 24 VDC AutoSetPAC

AutoSetPAC 24 VDC Model	Terminal Block	Pin #	Label
2-Channel	TB101	1	Channel 1 (Left Rear)
		2	Channel 2 (Right Rear)
		3	no connection
		4	no connection
		5	Ground
4-Channel	TB101	1	Channel 1 (Left Rear)
		2	Channel 2 (Right Rear)
		3	Channel 3 (Left Front)
		4	Channel 4 (Right Front)
		5	Ground

Refer to *Connecting AC and Stop Circuit Wiring*, page 33 if you need help connecting the wires to the terminals. Make sure not to wire the connector backwards.

4. Plug the connector back into the TB101B or TB101(A) terminal block. Check the wiring connections to make sure they are correct.

5. Connect the wires from TB101B or TB101(A) to the oscilloscope, following the manufacturer's instructions for your specific oscilloscope.

Connecting AC Wires to Power Source

Connect AC wires from the AutoSetPAC control to your AC power source only when you are finished connecting all wiring, including wiring for the optional oscilloscope.

⚠ WARNING

ELECTRIC SHOCK HAZARD
Make sure main power is off when you connect AutoSetPAC to the main power source.

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

Connecting a New AutoSetPAC to Original SmartPAC

If you are connecting a new AutoSetPAC load analyzer to an original SmartPAC control earlier than version V1.56, do the following:

1. Access the List of Installed Options screen on the Main Initialization Menu (similar to Figure 3-2, page 62), and verify the version number of SmartPAC and of Character Generator.

   - If SmartPAC firmware is earlier than V1.56, you must replace it with a current version.

   - If Character Generator is earlier than V1.07, you must replace it with version V1.07.

   Contact Wintriss Tech. Support to arrange for updated firmware.

2. If you must replace SmartPAC firmware, record the settings for start and stop time limits on the Set Brake Monitor screen in Initialization mode. Also, record the cam channel names shown on the Cam Channel Name Menu in Initialization before changing the firmware. Refer to your SmartPAC manual for assistance.

3. Power down SmartPAC.

4. Replace the SmartPAC firmware, if necessary, referring to the SmartPAC user manual.

5. Replace the character generator firmware, if necessary.

   The character generator firmware is located at the lower right of the power supply board (refer to the drawing in your SmartPAC user manual). The chip, which has a label on it, is identified on the board as component "U208."

   Note the orientation of the semi-circular notch on the firmware chip. When replacing the chip, make sure that the notch on the new chip faces in the same direction as the notch on the old chip.

6. Power up SmartPAC.

7. If you replaced the SmartPAC firmware, access the SmartPAC Main Initialization Menu and enter the brake monitor settings (select SET BRAKE MONITOR) and cam channel names (select SELECT CAM NAMES) you recorded in step 2. Refer to your SmartPAC user manual.

8. When you are finished, proceed with initialization and calibration of your AutoSetPAC.

9. Return the obsolete SmartPAC firmware board to Wintriss.

When you are ready to make parts, go to Program mode (see Chapter 4) and enter setpoint percentages and a sample period setting for each tool that was programmed previously.

Connecting an AutoSet to SmartPAC

AutoSet 2-Channel/2-Channel+ and AutoSet 4-Channel/4-Channel+ load analyzers can be connected to a SmartPAC control just like AutoSetPAC 2-Channel and 4-Channel units. See *Connecting AutoSet to SmartPAC Pro or SmartPAC 2* in the next section, or *Connecting an AutoSet to Original SmartPAC*, page 53.

Connecting AutoSet to SmartPAC Pro or SmartPAC 2

To connect an AutoSet to a SmartPAC, perform the following steps. Refer to your SmartPAC manual and to the wiring diagrams at the end of this manual.

1. Run the five-conductor shielded communications cable through flexible, liquid-tight, low-voltage conduit from SmartPAC to AutoSet. If you have SmartPAC and AutoSet enclosures, they are rated NEMA 12 (protected against dust and oil). You must use conduit of the same rating and make proper connections to ensure NEMA 12 protection. Wiring goes through the bottom right knockout on the SmartPAC enclosure and through the bottom left knockout on the AutoSet enclosure.

2. Make communications wiring connections as shown in Table 2-13, referring also to Figure 1 or Figure 2 at the end of the manual for SmartPAC 2, Figure 8 or Figure 9 for SmartPAC PRO.

Table 2-13. Communications Wiring Connections: AutoSet and SmartPAC 2 or SmartPAC PRO

AutoSet		SmartPAC 2		SmartPAC PRO	
TB104 Pin #	**Signal ***	**TB103 Pin #**	**Signal ***	**TB6 Pin #**	**Signal ***
1	(GND)	240	(GND)	240	(GND)
2	(+TXD)	241	(+RXD2)	241	(+RXD2)
3	(-TXD)	242	(-RXD2)	242	(-RXD2)
4	(+RXD)	243	(+TXD2)	243	(+TXD2)
5	(-RXD)	244	(-TXD2)	244	(-TXD2)

* Shield should be connected to ground stud on enclosure nearest entry of communications wiring (see Figure 2-13, page 45).

3. Verify that switch 6 on Mode switch block S101 on the AutoSet processor board is set to the OFF position, its default setting.

4. Remove the AutoSet firmware chip, and replace it with a new chip.

    The chip, which has a label on it, is identified as component "XU106" and is located directly beneath the power transformer (T101) at the top of the AutoSet processor board (see board drawings in AutoSet user manual).

5. Note that the semi-circular notch on the firmware chip faces to the left. When replacing the chip, make sure that the notch on the new chip also faces to the left.

6. If you have not installed a zero cam switch and wired a zero cam input to your AutoSet, wire the SmartPAC zero cam output to the AutoSet zero cam input according to Table 2-8 or Table 2-9, page 46 and the appropriate wiring diagrams at the end of this manual. You can run the zero cam wiring through the same conduit as the communications wiring used in step 2.

7. Power up SmartPAC.

8. Select TONNAGE MONITOR on the Main Initialization Menu to display the Tonnage Monitor Initialization Menu.

9. Select INITIALIZE PARAMETERS on the Tonnage Monitor Initialization Menu. Press ENTER when the warning message displays to confirm that you want to continue with initialization.

10. Set the capacity of your press on the Tonnage Monitor Initialization Menu, and enable or disable the repeatability setpoint, the startup counter, and setup mode.

11. Select SECURITY ACCESS on the Tonnage Monitor Initialization Menu, and configure AutoSet security the way you want it.

12. When you are ready to make parts, go to Program mode and enter setpoint percentages and a sample period setting for each programmed tool (see *Making Tonnage Monitor Settings*, page 96).

13. Return the old AutoSet firmware chip to Wintriss.

Connecting an AutoSet to Original SmartPAC

To connect an AutoSet to original SmartPAC, perform the following steps. Refer to your Original SmartPAC manual and the wiring diagrams 4 and 5 at the end of this manual.

1. Access the List of Installed Options screen on the Main Initialization Menu (similar to Figure 3-2, page 62), and verify the version number of SmartPAC and of Character Generator.

   • If SmartPAC firmware is earlier than V1.56, you must replace it with a current version.

   • If the Character Generator is earlier than V1.07, you must replace it with version V1.07.

   Contact Wintriss Tech. Support to arrange for updated firmware.

2. If you must replace SmartPAC firmware, be sure to record the settings for start and stop time limits on the Set Brake Monitor screen in Initialization mode. Also, record the cam channel names shown on the Cam Channel Name Menu in Initialization before changing the firmware. Refer to your SmartPAC manual for assistance.

3. Perform steps 3 through 6 in *Connecting a New AutoSetPAC to Original* SmartPAC, page 51.

4. Remove the AutoSet firmware chip, and replace it with a new chip.

   The chip, which has a label on it, is identified on the board as component "XU106" and is located directly beneath the power transformer (T101) at the top of the AutoSet processor board (see board drawing in AutoSet user manual).

   Note that the semi-circular notch on the firmware chip faces to the left. When replacing the chip, make sure that the notch on the new chip also faces to the left.

5. Run a communications cable between the AutoSet and SmartPAC and wire both ends to the appropriate connector, repeating steps 1 through 4 of *Connecting AutoSet to SmartPAC Pro or SmartPAC 2 procedure*, above. Refer to Table 2-14 for wiring connections.

Table 2-14. Communications Wiring Connections: AutoSet and Original SmartPAC

AutoSet TB104 Pin # *	Original SmartPAC TB102 Pin # *
1 (GND)	240 (GND)
2 (+TXD)	241 (+RXD2)
3 (-TXD)	242 (-RXD2)
4 (+RXD)	243 (+TXD2)
5 (-RXD)	244 (-TXD2)

* Shield should be connected to ground stud on enclosure nearest entry of communications wiring (see Figure 2-13, page 45).

6. If you have not installed a zero cam switch and wired a zero cam input to your AutoSet, wire the SmartPAC zero cam output (pin #211 on TB101 on the SmartPAC processor board) to the AutoSet input (pin #2 on TB101(A) or TB101B) on the AutoSet processor board. You can run the zero cam wiring through the same conduit as the communications wiring used in step 5.

7. Power up SmartPAC.

8. If you replaced the SmartPAC firmware, access the SmartPAC Main Initialization Menu and enter the brake monitor settings (select SET BRAKE MONITOR) and cam channel names (select SELECT CAM NAMES) you recorded in step 2. Refer to your SmartPAC user manual, if necessary.

9. Select TONNAGE MONITOR on the Main Initialization Menu to display the Tonnage Monitor Initialization Menu.

10. Select INITIALIZE PARAMETERS on the Tonnage Monitor Initialization Menu. Press ENTER when the warning message displays to confirm that you want to continue with initialization.

11. Set the capacity of your press on the Tonnage Monitor Initialization Menu, and enable or disable the repeatability setpoint, the startup counter, and setup mode.

12. Select SECURITY ACCESS on the Tonnage Monitor Initialization Menu, and configure AutoSet security the way you want it.

13. When you are ready to make parts, go to Program mode and enter setpoint percentages and a sample period setting for each tool programmed in SmartPAC (see *Making Tonnage Monitor Settings*, page 96).

14. Return the obsolete SmartPAC firmware board and the old AutoSet firmware chip to Wintriss.

Powering Up AutoSetPAC

Once AutoSetPAC is connected to a power source, do the following to power up the unit:

1. Turn on power to SmartPAC.

2. Check the Main Program Menu or Main Run Menu to make sure that the TONNAGE/WAVEFORM item appears.

3. If the TONNAGE/WAVEFORM menu item is not displayed, turn off power to the SmartPAC. Re-check connections for power, communications, and strain links. Make sure the voltage selector switch is set correctly (either 115V or 230V). Then turn power on again and check for the TONNAGE/WAVEFORM menu item.

4. If TONNAGE/WAVEFORM still does not display, perform the *Tonnage/WaveForm Menu Option Does Not Display at Power-up (Communications Error)* troubleshooting procedure, page 125. Then power up the unit again.

5. If TONNAGE/WAVEFORM still does not display, call Wintriss Tech. Support.

Once you have made all connections and AutoSetPAC has power, you are ready to calibrate the unit. See *Chapter 3*, page 59.

Installing New AutoSetPAC Firmware

⚠ WARNING

ELECTRIC SHOCK HAZARD

• Disconnect main power at SmartPAC and AutoSetPAC 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.

• Remove all fuses and "tag out" per OSHA 1910.147 Control of Hazardous Energy (Lockout/Tagout).

• Ensure that this procedure is performed by qualified personnel.

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

NOTICE

YOU MAY ALSO HAVE TO UPGRADE YOUR SMARTPAC FIRMWARE

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

To install an updated version of AutoSetPAC firmware, perform the following steps:

1. Verify that power has been turned off to SmartPAC, AutoSetPAC, the press, and any auxiliary equipment.

2. Verify that all LEDs on the AutoSetPAC Processor board are off (see Figure 2-6 or Figure 2-7 for LED locations).

CAUTION

STATIC DISCHARGE DAMAGE TO CHIP

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

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

---

3. Making sure that you are grounded, open the AutoSetPAC enclosure and locate the firmware chip, labelled XU106, on the AutoSetPAC Processor board (see Figure 2-6 or Figure 2-7). Note that the chip has a white label and the semi-circular notch on the chip faces to the left.

NOTICE

The new AutoSetPAC firmware chip must also be installed with the notch facing left.

CAUTION

If you use a screwdriver, be careful not to insert the screwdriver under the socket or you may damage the board.

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

---

4. Use a chip puller to remove the old chip, or insert a small screwdriver between the bottom of the chip and the socket and carefully pry the chip from the board. Put the chip aside.

5. Making sure you are grounded, open the package containing the new firmware chip, and remove the chip from its holder.

CAUTION

CHIP INSTALLED INCORRECTLY

• Install the chip with the notch facing left; otherwise, when you power up the control, the chip will be destroyed.

• Align pins correctly with the socket before plugging chip in.

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

---

6. Plug the chip into its socket, inserting the left row of pins first, then aligning the right row of pins over the socket and pushing them in. Make sure that the notch in the chip faces left and that all of the pins are in the socket.

NOTICE

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

---

7. To verify that the chip is installed correctly, close the AutoSetPAC enclosure, and power up the SmartPAC and AutoSetPAC.

   • If the SmartPAC powers up normally, go to step 8.

- If the SmartPAC powers up with a fault message like the following

  A [2 OR 4] CHANNEL AUTOSETPAC WAS
  INSTALLED THE LAST TIME THE UNIT
  WAS POWERED-UP AND WAS NOT SEEN
  THIS TIME.

one or more pins may be bent or not plugged in properly. Turn the power off, and repeat the procedure in the Notice for step 6. Power the unit up again. If the same fault message displays, contact Wintriss Tech. Support.

8. Access the List of Installed Options screen in SmartPAC Initialization, referring to your SmartPAC manual if necessary. AutoSetPAC should be displayed in the options list along with its new firmware version number (for example, V2.00).

9. If AutoSetPAC appears in the list, you have completed installation of your new firmware successfully.

10. If AutoSetPAC is not in the list, contact Wintriss Tech. Support.

Chapter 3   Initialization and Calibration

This chapter shows you how to set Initialization parameters for AutoSetPAC in SmartPAC Initialization mode and calibrate the AutoSetPAC unit. It is organized in the following sections:

NOTICE

"SmartPAC" refers to original SmartPAC, SmartPAC 2, and SmartPAC PRO, unless otherwise indicated.

NOTICE

REFER TO YOUR SMARTPAC USER MANUAL

Instructions for using the screens in Initialization mode are provided in Chapter 4 of the user manual for your version of SmartPAC. For help in entering data or selecting items, refer to Chapter 3 of the manual.

NOTICE

USING SMARTPAC HELP

If you need help with an Initialization mode screen, press the HELP or ⌞?⌟ key when that screen is displayed.

Making Settings on Switch Block S101

Two switches on switch block S101 (located at left center of the AutoSetPAC Processor board–see Figure 2-6, page 35 or Figure 2-7, page 36) can be used to make special AutoSetPAC configuration

settings. Switch 6 can be set to allow two AutoSetPACs to be connected to a single SmartPAC. Switch 7 allows you to set an AutoSetPAC 4-Channel load monitor, which by default is configured with four strain link channels, as a two-channel unit. Switches 1 through 5 and switch 8 are unused. All eight switches on S101 are set to OFF by default, as shown in Figure 3-1, page 60.

Switch 6 and 7 settings are shown in Table 3-1.
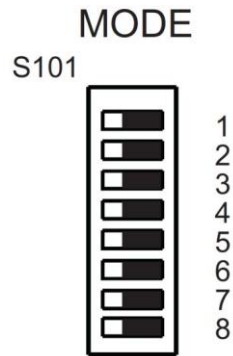
Figure 3-1. Switch Block S101 (Default Settings Shown)

Table 3-1. Switch Block S101 Settings

S101 Switch Number	Setting
1	Unused
2	Unused
3	Unused
4	Unused
5	Unused
6	OFF (Default) Identifies an AutoSetPAC as a single unit connected to SmartPAC or as the first of two connected AutoSetPACs. If a second AutoSetPAC is connected, switch 6 on that unit must be set to ON. ON Identifies an AutoSetPAC as the second of two units connected to SmartPAC. Switch 6 on the first unit must be set to OFF.
7	OFF (Default) AutoSetPAC 4-Channel operates as a four-channel unit. ON Configures AutoSetPAC 4-Channel as a two-channel unit.
8	Unused

Accessing the SmartPAC Main Initialization Menu

NOTICE

Many of the menus in this manual are from the original SmartPAC. However, the menus on SmartPAC 2 and SmartPAC PRO are similar. The menu organization is the same for all versions of SmartPAC.

Navigation and data entry on the SmartPAC PRO are accomplished on its touch screen, while the original SmartPAC and SmartPAC 2 use keypads and function keys. See *Original SmartPAC and SmartPAC 2 Front Panels*, page 22, or *SmartPAC PRO Front Panel*, page 23, and the user manual for your version SmartPAC.

NOTICE

When switching between operating modes with the Program/Run key, make sure that SmartPAC is displaying the top-level screen in the current mode (i.e., Main Program Menu or Main Run Menu). To return to the top-level menu, press RESET or EXIT repeatedly.

To access the Initialization Menu on original SmartPAC, SmartPAC 2, or SmartPAC PRO, do the following:

Access Original SmartPAC or SmartPAC 2 Initialization Menu	1. Turn the Program/Run key on the SmartPAC front panel to "PROG." 2. Press the "1" and "CLEAR" keys simultaneously for one second. The Main Initialization Menu appears (SmartPAC 2 is Figure 3-2, below; original SmartPAC is similar). The screen you see may be slightly different depending on your installed options.
Access SmartPAC PRO Initialization Menu	1. Turn the Program/Run key switch to "PROG." 2. Select "INITIALIZATION MENU" from the Main Programming Menu. The menu appears, Figure 3-3, below.
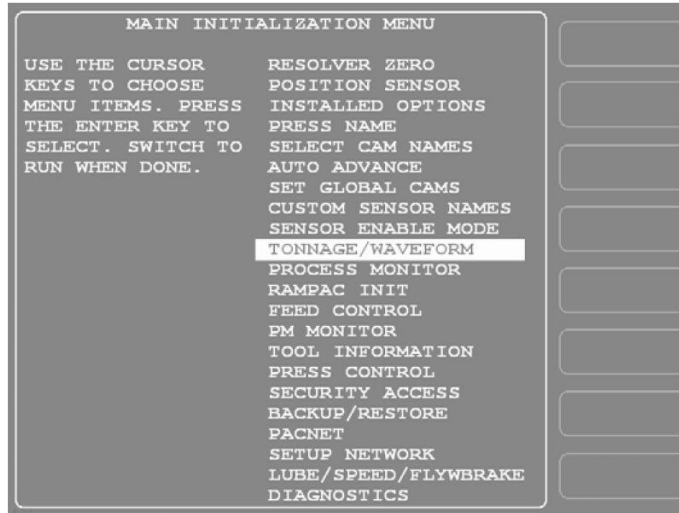
Figure 3-2. SmartPAC 2 Main Initialization Menu
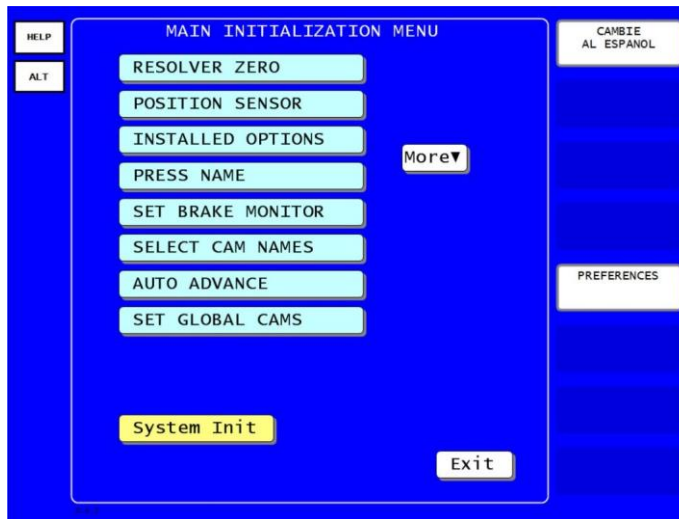
Figure 3-3. SmartPAC PRO Initialization Menu

Making Tonnage/Waveform Initialization Settings

This section shows you how to make settings on the Tonnage/Waveform Initialization Menu (see Figure 3-4), which you access by selecting TONNAGE/WAVEFORM on the Main Initialization Menu.
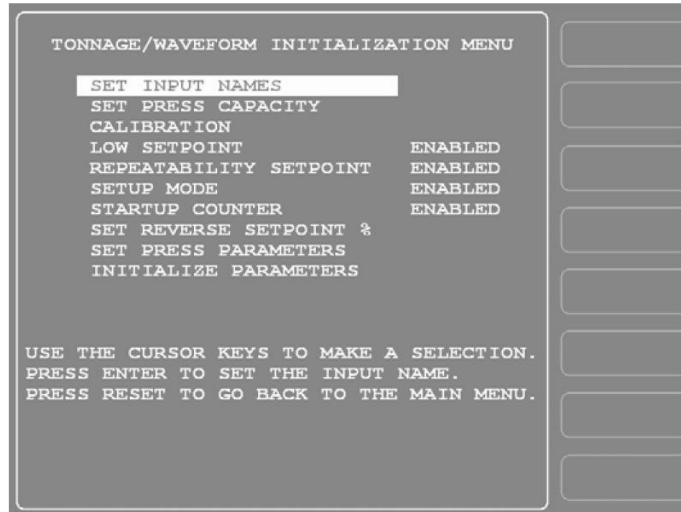
Figure 3-4. Tonnage/Waveform Initialization Menu

The following settings are covered:

- *Initializing Parameters*, page 63

- *Setting Input Names*, page 64

- *Disabling/Enabling AutoSetPAC Parameters*, page 66

- *Setting Reverse Setpoint % of Press Capacity*, page 66

Instructions for setting press capacity are provided in *Setting Full-scale Tonnage on Your AutoSetPAC*, page 83. To make calibration settings, refer to *Adjusting AutoSetPAC To Read the Correct Tonnage*, page 85.

Initializing Parameters

Before making Initialization settings, you must initialize AutoSetPAC. This action clears all current Initialization parameters and returns the unit to the default Initialization settings made at the factory. To initialize AutoSetPAC, do the following:

1. Select "INITIALIZE PARAMETERS," the last item on the Tonnage/Waveform Initialization Menu. The warning message shown in Figure 3-5 will display.
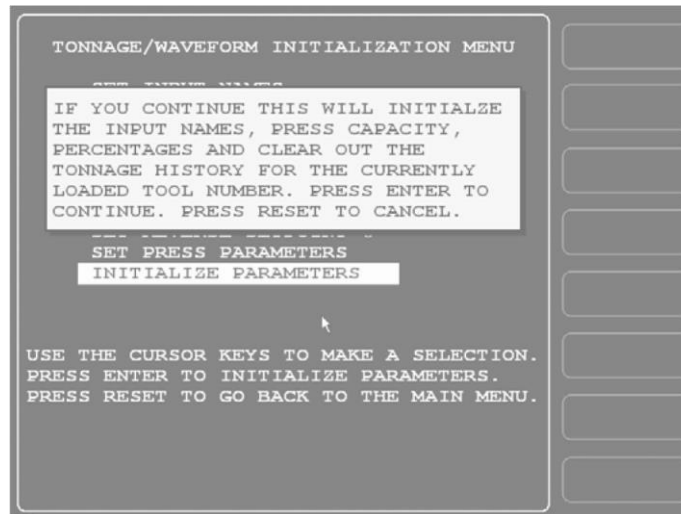
Figure 3-5. Initialize Parameters Warning Message

2. Press ENTER to confirm that you want to continue with initialization.

Setting Input Names

The SET INPUT NAMES item on the Tonnage/Waveform Initialization Menu allows you to change the default names for AutoSetPAC's strain link channels. If you have an AutoSetPAC 2-Channel load analyzer, two input names can be set. If you have an AutoSetPAC 4-Channel unit, you can set four input names. To change the Input Name defaults, do the following:

1. Select "SET INPUT NAMES" to display the Load Monitor Input Name Menu (see Figure 3-6, page 65). Default input names are as follows:

    *   Input 1–Left Rear

    *   Input 2–Right Rear

    *   Input 3–Left Front

    *   Input 4–Right Front
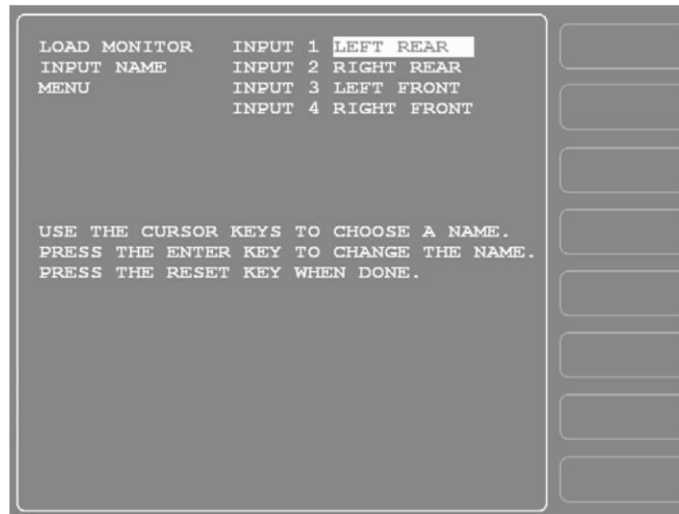
Figure 3-6. Load Monitor Input Name Menu with "INPUT 1" Highlighted

2. To change an input name, select that entry. An Alphabetic Entry window displays, as shown in Figure 3-7.
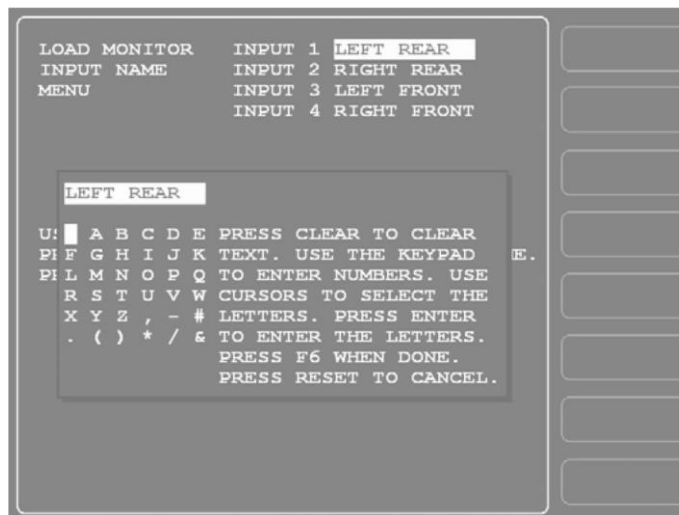
Figure 3-7. Load Monitor Input Name Menu with Alphabetic Entry Window Displayed

3. Follow the directions in the window to key in the name you want. The name can be any combination of alphabetic characters, numbers, and symbols.

- To key in letters, use the Up (▲), Down (▼), Left (◀), and/or Right (▶) cursor keys to highlight each letter, then press ENTER to select it.

- To key in numbers, press the desired selection on the numeric keypad, and press ENTER.

- To clear an entry, press the CLEAR key.

- To accept your selection, press the **F6** function key.
  To cancel your selection, press RESET.

4. Press RESET to return to the Tonnage/Waveform Initialization Menu.

NOTICE

The Press Capacity and Calibration items on the Tonnage Monitor Initialization Menu are used during the calibration procedure. Instructions for setting them are provided in *Setting Full-scale Tonnage on Your AutoSetPAC*, page 83, and *Adjusting AutoSetPAC To Read the Correct Tonnage*, page 85.

Disabling/Enabling AutoSetPAC Parameters

The Tonnage/Waveform Initialization Menu allows you to enable or disable the following AutoSetPAC functions:

- Low setpoint

- Repeatability setpoint

- Setup mode

- Startup counter

When you disable an item, that functionality is no longer available in AutoSetPAC. For example, if you disable the low setpoint, the Low Setpoint field does not appear on Program and Run screens and, therefore, cannot be set.

Low and repeatability setpoints are explained in *AutoSetPAC's Setpoint Calculation Process*, page 91. The startup counter is discussed in *Startup Counter,* page 93.

Setup mode allows you to operate the press in Inch without generating low setpoint or repeatability faults. When Setup Mode is enabled, AutoSetPAC disables low and repeatability setpoints whenever the press is operated in Inch. In order to be functional, Setup mode also requires that you wire a Setup Mode circuit in SmartPAC (see Chapter 2 in your SmartPAC user manual). No special wiring is required if your AutoSetPAC is being used with SmartPAC integrated with WPC 2000.

The high setpoint does not appear on this screen because the high setpoint cannot be disabled.

To enable or disable one of these items, do the following:

1. Press ENTER with the cursor resting in the desired field until the setting you want is displayed. The setting changes from ENABLED to DISABLED or from DISABLED to ENABLED each time you press ENTER.

2. Move the highlight bar to the next field and repeat step Press ENTER with the cursor resting in the desired field until the setting you want is di.

Setting Reverse Setpoint % of Press Capacity

The SET REVERSE SETPOINT % item on the Tonnage/Waveform Initialization Menu allows you to set the percentage that AutoSetPAC uses to calculate the high setpoint for "snap-through" reverse tonnage. The reverse tonnage setpoint is calculated by multiplying the value you enter in this field by the full-scale capacity of the press, which is also set on the Tonnage Monitor Initialization Menu (see *Setting Full-scale Tonnage on Your AutoSetPAC*, page 83). Press manufacturers typically recommend that reverse loads not exceed between 15% and 25% of press capacity. Refer to the manufacturer's specifications to determine the correct value for your press.

Actual reverse tonnage values can be viewed in Run mode (see *Viewing Reverse Tonnage*, page 118).

To set the reverse tonnage setpoint percentage, do the following:

1. Select "SET REVERSE SETPOINT %." When the Numeric Entry window (see Figure 3-8) displays, key in the desired percentage value, following the directions in the window.
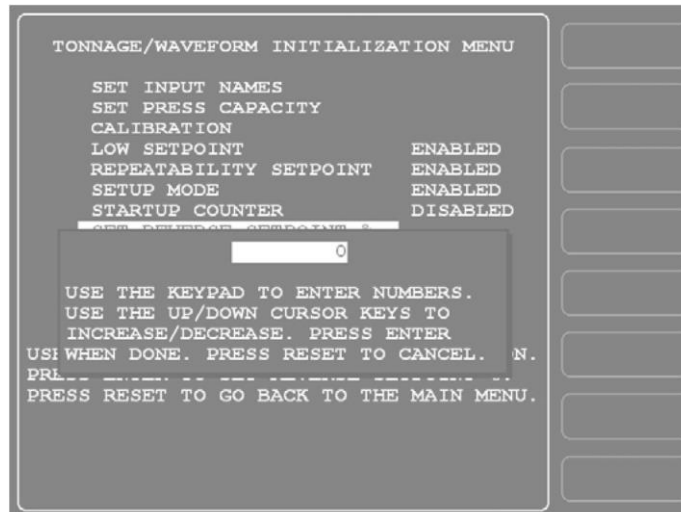
Figure 3-8. Numeric Entry Window Superimposed on Tonnage Monitor Initialization Menu

2. Press ENTER to confirm your entry, or press RESET to cancel.

NOTICE

YOU CANNOT DISABLE REVERSE SETPOINT %

Reverse Setpoint % cannot be disabled. The default for this setting is 20%. However, we recommend that you set this value according to the specifications for your press.

Locking Run Mode Actions

You can prevent unauthorized personnel from recalculating setpoints or making adjustments to setpoint percentages in Run mode. To do so, you "lock out" these capabilities from Run mode on the Security Access Menu and remove the "Program/Run" key when SmartPAC is switched to Run mode. When setpoint recalculation and adjustment capabilities are locked out of Run mode, they are still functional in Program mode.

To "lock out" one or both of these actions in Run mode, do the following:

1. Select "SECURITY ACCESS" on the Main Initialization Menu (see Figure 3-2). A screen like the one shown in Figure 3-9 displays. (The items on your menu may differ depending on installed options.) Note that the LOAD MONITOR item shown in Figure 3-9 is set to "ALLOW RECALC/ADJUST," a setting that allows the operator to recalculate and adjust setpoints in Run mode. This is the factory setting.
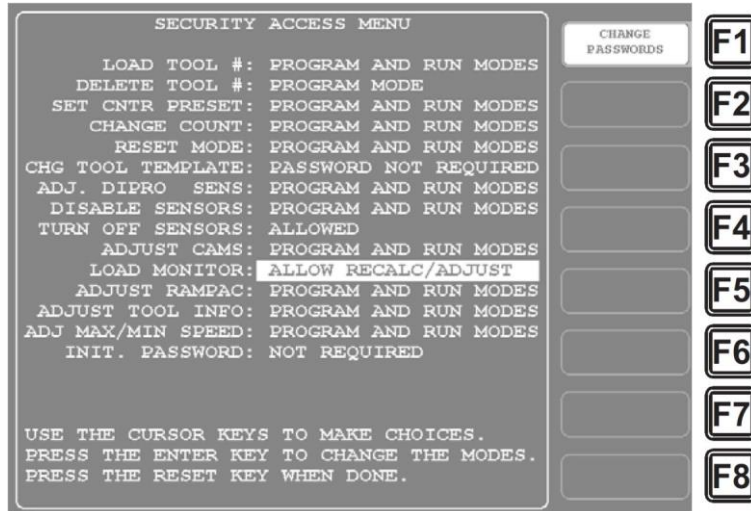
Figure 3-9. Security Access Menu with Load Monitor Setting Highlighted

2. Select the "LOAD MONITOR" item, and press ENTER to cycle through the available settings: ALLOW RECALC/ADJUST, ALLOW RECALC ONLY, NO RECALC/ADJUST, and PASSWORD REQUIRED.

    The ALLOW RECALC ONLY setting locks out the setpoint adjustment capability from Run mode. The NO RECALC/ADJUST setting locks out both setpoint recalculation and setpoint adjustment from Run mode. The PASSWORD REQUIRED setting specifies that a password be entered in Run mode in order for the operator to recalculate or adjust setpoints.

3. When the setting you want is displayed, press RESET. You are returned to the Main Initialization Menu.

NOTICE

LOCKING OUT OTHER FUNCTIONS
Refer to Chapter 4 in the SmartPAC user manual for information on locking out other functions on the Security Access Menu.

NOTICE

LOCKING RESET MODE
If you want to prevent tonnage faults and other errors from being reset in Run mode, you can set the RESET MODE item on the Security Access Menu to "PROGRAM MODE ONLY" and remove the Program/Run key with the press in Run mode.

With this setting selected, all faults, including brake monitor and counter messages and fault conditions associated with optional SmartPAC modules like DiProPAC, ProCamPAC, and WPC 2000, must be cleared in Program mode.

This setting is useful if responsibility for recording SmartPAC faults has been assigned to one person.

Viewing Communications

The "COMMUNICATIONS" item on the Diagnostic Menu (see Figure 3-10) allows you to verify communications between SmartPAC and AutoSetPAC. To view communications, perform the following steps:

1. Select "DIAGNOSTICS" on the Main Initialization Menu (see Figure 3-2) to display the Diagnostic Menu.
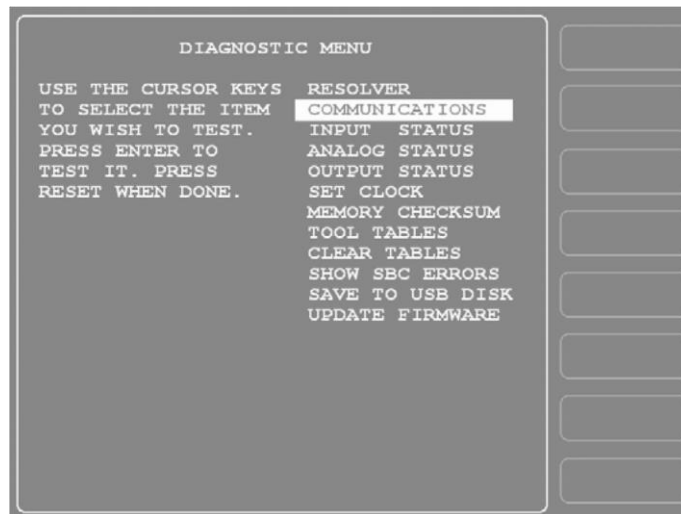
Figure 3-10. COMMUNICATIONS Item on Diagnostic Menu in Initialization Mode

2. Select "COMMUNICATIONS" on the Diagnostic Menu to display the Communication Data Viewer screen, shown in Figure 3-11.
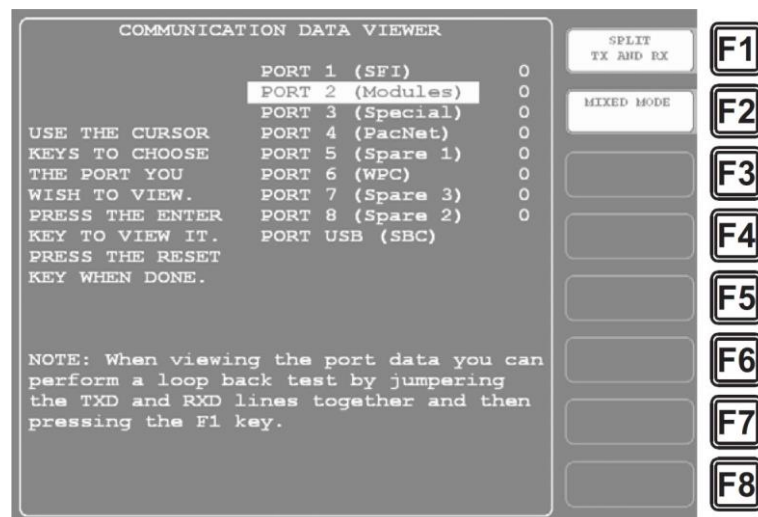
Figure 3-11. Communication Data Viewer Screen

3. Press the F1 function key on the Communication Data Viewer screen to change the F1 label from "Combined Tx and Rx" to "Split Tx and Rx."

4. Select "PORT 2 (Modules)." A screen like the one shown in Figure 3-12 will appear.

```
             TRANSMIT BUFFER DATA                SEND LOOPBACK    ┌──┐
                                                   MESSAGE        │F1│
1;:MF7BB$B1;:MF7BB$B1;:MF7BB$B1;:MF7BB$B                          └──┘
1;:MF7BB$B1;:MF7BB$B1;:MF7BB$B1;:MF7BB$B          STOP/START      ┌──┐
1;:MF7BB$B1;:MF7BB$B1;:MF7BB$B1;:MF7BB$B           BUFFER         │F2│
1;LOOP BACK MESSAGE PORT 6█;:MF7BB$B1;:M                          └──┘
F7BB$B1;:MF7BB$B1;:MF7BB$B1;:MF7BB$B1;:M                          ┌──┐
F7BB$B1;:MF7BB$B1;:MF7BB$B1;:MF7BB$B1;:M                          │F3│
F7BB$B1;:MF7BB$B                                                  └──┘
                                                                  ┌──┐
                                                                  │F4│
             RECEIVE BUFFER DATA                                  └──┘
                                                                  ┌──┐
[0D]:S010;HHHH;100BE00BC00C100E903EB0141014                       │F5│
00070100BE00BC00C100E903EB014101400070100BE                      └──┘
00BC00C100E903EB01410140007                                      ┌──┐
[0D]:S010;                                                        │F6│
                                                                  └──┘
                                                                  ┌──┐
                                                                  │F7│
                                                                  └──┘
                                                                  ┌──┐
                                                                  │F8│
                                                                  └──┘
```

Figure 3-12. Communications Transmit/Receive Screen

If SmartPAC and AutoSetPAC are communicating normally, you should expect to see data in both the "TRANSMIT BUFFER DATA" and "RECEIVE BUFFER DATA" portions of the screen. If you do not see any data (or only partial data), this means that SmartPAC and AutoSetPAC are not communicating properly.

If there is a communications problem, you may decide to perform a loopback test. In a loopback test, you connect (or jumper) the TXD (Transmit) and RXD (Receive) lines (refer to Figure 3 at the end of this manual), and then press F1 to check communications. In effect, you are "receiving" the communications data that you are transmitting.

This test is useful when verifying the accuracy of the transmit and receive hardware and wiring. If you need help performing the loopback test, contact Wintriss Tech. Support.

Calibrating AutoSetPAC

This section shows you how to calibrate an AutoSetPAC load analyzer so that it displays an accurate reading of the tonnage applied by the press. You learn how to do the following:

1. Adjust each strain link until it provides a "zero" signal with no load on the press, following the instructions in *Zeroing Strain Links*, page 71.

2. Using a separate tonnage monitor and one or two load cells, apply a load to the press and measure it, following the instructions in *Recording Tonnage on an AutoSet Calibration Kit*, page 75. You can use your own calibration gear, or rent an AutoSet 2-Channel calibration kit from Wintriss.

3. Determine the tonnage capacity of your press, and set the full-scale tonnage of your AutoSetPAC to that value, following the instructions in *Setting Full-scale Tonnage on Your AutoSetPAC*, page 83.

4. Adjust your AutoSetPAC until its tonnage displays agree with the tonnage recorded on your calibration unit, following the instructions in Adjusting AutoSetPAC To Read the Correct Tonnage, page 85.

AutoSetPAC should be calibrated after installation and whenever

- Strain links are moved to a different location on the press

- Tie rods are restressed

- Major repair work is performed on the press frame

Before starting calibration, make sure the press is adjusted for optimal operation. Check to make sure that the ram is parallel to the bed and that the gib/ways adjustment and tie rod tension are correct.

Zeroing Strain Links

Before starting this procedure, make sure that the strain links have been mounted loosely on the press and strain link cables have been wired to the appropriate connectors on the AutoSetPAC processor board as described in *Installing Strain Links*, page 39. Then, to set the strain links to read zero (0) at no load, do the following:

1. Move the press ram to top dead center.

2. Apply power to SmartPAC.

3. Turn the Program/Run key to PROG, then press the "1" and "CLEAR" keys simultaneously and hold down a few seconds until the Main Initialization Menu (see Figure 3-2) appears.

4. Select the TONNAGE/WAVEFORM menu item, and press ENTER to display the Tonnage/Waveform Initialization Menu (see Figure 3-4).

5. Select CALIBRATION and press ENTER to display the Calibration screen (see Figure 3-13).

6. Press F4 (Zero Offsets). As shown in Figure 3-13, the caption at the top of the screen changes to "CURRENT ZERO OFFSETS" and the values for the two (AutoSetPAC 2-Channel) or four (AutoSetPAC 4-Channel) channels change to the current offsets.
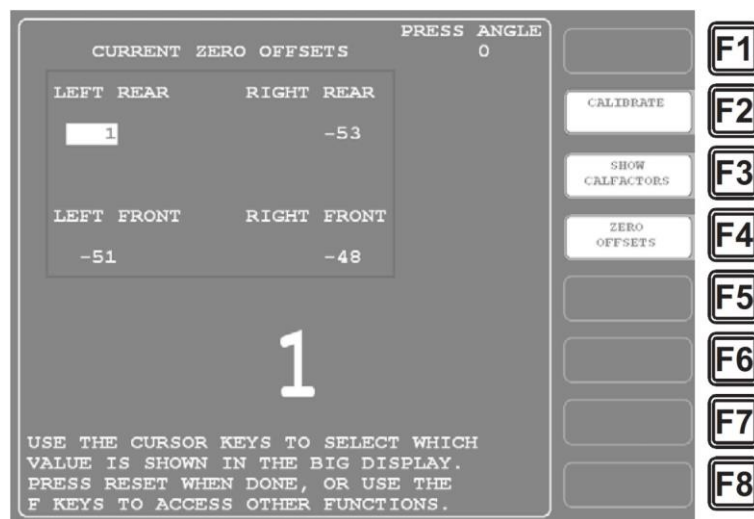
Figure 3-13. Calibration Screen: Current Zero Offsets Display

> **NOTICE**
>
> If the strain link Zero Offsets reading is greater than ±99, a message like the following displays:
>
> *Offset Error, signal too low on*
>
> *INPUT 1 LEFT*
>
> *The message specifies whether the strain link is set too high (i.e., >+99) or too low (i.e., >-99) and identifies the strain link channel that is out-of-range. If multiple strain links are out-of-range, the message displays for only one channel.*

7. If one of the strain links is generating an offset error, select that strain link to adjust first. Otherwise, select any strain link.

8. If the potentiometer adjustment screw on the strain link is not accessible via a hole in the cover, loosen the two screws securing the cover, and remove it. The adjustment screw is located on the strain link circuit board, as shown in Figure 3-14.

> **NOTICE**
>
> The potentiometer adjustment screw is accessible through a hole in the cover on strain links with a Hirschman connector (part no. 9641801, standard, or 9685105, metric). Newer versions of other strain links (part nos. 9641601, 9641602, 9641603, and 9641604, standard, or 9685101, 9685102, 9685103, and 9685104, metric) may also provide an access hole.
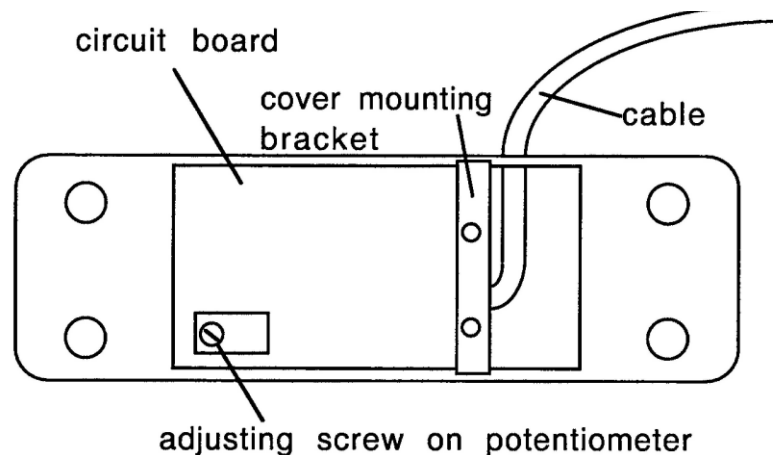
Figure 3-14. Potentiometer Adjustment Screw on Strain Links without Access Hole in Cover

9. Check the value in the Zero Offsets display for the strain link you are zeroing. If the value is greater than ±5, perform step 10. Otherwise, go to step 11.

> **NOTICE**
>
> If the zero adjustment reading is greater than ±99, an "Offset Error" message displays for that strain link and remains displayed until you have adjusted the reading to less than ±99 and pressed the RESET key. The Zero Offsets display will then show the offset to which you have adjusted the strain link.

10. Turn the potentiometer adjustment screw clockwise or counterclockwise, as shown in Table 3-2, until the Zero Offsets display for that channel reads between +5 and -5. Try to adjust the tonnage reading as close to zero as possible.

Table 3-2. Strain Link Potentiometer: Direction of Screw* Adjustment

Zero Offsets Display	Potentiometer Adjustment: Tension †	Potentiometer Adjustment: Compression ‡
Positive number	Turn counterclockwise	Turn clockwise
Negative number	Turn clockwise	Turn counterclockwise

*   The adjustment screw has a range of only twelve (12) turns in either direction. After this limit is reached, you can continue to turn the screw, but the tonnage reading will not be affected.

† Strain links measure tension when mounted on straight-side presses or on the front of gap-frame (OBI or OBG) presses (see Figure 2-10, page 41 and Figure 2-11. page 42)

‡ Strain links measure compression when mounted on the back of gap-frame (OBI or OBG) presses (see Figure 2-10, page 41)

NOTICE

If you cannot use the Zero Offsets display to zero the strain links (i.e., display is too far away or is obstructed), perform the *Using a Voltmeter to Zero Strain Links* procedure, page 74.

NOTICE

If you cannot get the Zero Offsets display to read in the ±5 range, make sure strain link wiring connections are tight and the connector is firmly seated. If loose connections are not the problem, the strain link may not be working properly. Contact Wintriss Tech. Support for assistance.

NOTICE

Make sure to use removable-strength Loctite (i.e., No. 242 or equivalent) on the mounting screws. Do not use permanent-strength Loctite, which will prevent removal of the screws if you need to remount the strain links.

---

11. Remove each mounting screw from the strain link, apply removable-strength Loctite (i.e., No. 242 or equivalent) to the screw, and re-seat the screw in its tapped hole.

12. Tighten the screws evenly around the perimeter of the strain link to a specification of 150 in./lbs.

13. Check the strain link's Zero Offsets value in SmartPAC.

14. Using the potentiometer adjustment screw (refer to Table 3-2), adjust the strain link offset until it falls between +50 and -50. Try to adjust the offset as close to zero as possible.

---

15. If you cannot adjust the strain link's offset reading to within the ±50 window, loosen the mounting screws and repeat steps 12 through 14.

NOTICE

If after several attempts you cannot get the Zero Offsets display to read in the ±50 range, the strain link mounting holes may not have been drilled at right angles to the mounting surface, or the strain link may not be working properly. Contact Wintriss Tech. Support for assistance.

---

16. Replace the strain link cover, if necessary, when you have finished zeroing the strain link.

NOTICE

When multiple strain links have zero offsets readings outside the ±99 window, an Offsets Error message will display for only one strain link channel at a time. When that strain link has been adjusted to a value within the ±99 window, an Offsets Error message will display for one of the remaining out-of-range strain links.

---

17. Zero the remaining strain links, repeating steps 7 through 16. Start with any strain link that is generating an Offsets Error message on the Current Zero Offsets display. When no strain link is generating an Offsets Error message, proceed with zeroing the strain links that remain.

18. When all the strain links have been zeroed, press RESET or EXIT repeatedly to return to the SmartPAC Main Initialization Menu.

Using a Voltmeter to Zero Strain Links

Perform the following procedure if the AutoSetPAC Zero Offsets display cannot be used to zero strain links (i.e., display is too far away or is obstructed).

1. On the AutoSetPAC processor board, place the leads of a voltage meter on the pins holding the white and green wires (i.e., pins 2 and 3) in the cable from the strain link you are having trouble zeroing.

2. Adjust the potentiometer screw on that strain link until the reading shown on the voltmeter is close to 0Vdc.

NOTICE

The displayed voltage does not have to be exactly 0 Vdc. If the reading on the voltmeter is between + 0.70 and - 0.70 Vdc, the strain link can be considered zeroed.

---

3. Check the Zero Offsets display. If it reads between +50 and -50, you are finished.

If the Zero Offsets display continues to show a value outside this range, the strain link is bad and should be replaced. Contact Wintriss Tech. Support for assistance.

Recording Tonnage on an AutoSet Calibration Kit

Setting Up and Adjusting the Calibration Kit

This procedure shows you how to set up the AutoSet 2-Channel calibration kit and adjust it to display the correct tonnage applied to the load cells. If you are using another calibration kit to measure tonnage on the load cells, follow the instructions provided by that manufacturer.

NOTICE

USE OF HYDRAULIC JACK FOR CALIBRATION NOT RECOMMENDED
Wintriss does not recommend use of a hydraulic jack for calibration. A hydraulic jack is much less accurate than load cells and more difficult to use. For more information on hydraulic jack calibration, contact Wintriss Tech. Support.

The AutoSet 2-Channel calibration kit should contain the following items:

- Calibration modules. These are small enclosures with cables attached. A connector on the end of each cable plugs into one of the strain link connectors on the AutoSet processor board. Each calibration module enclosure provides a screw-in connector for the cable from one of the load cells.

- Up to two load cells and cables. Use one load cell (single-point calibration) if your press has only one connecting rod (Pitman), two load cells (double-point calibration) if you have two (or more) connecting rods. Load cells are placed under the connecting rods.

To adjust the calibration kit to display the correct tonnage applied to the load cells, perform the following steps, referring to Figure 3-15, page 77, or Figure 3-16, page 78, for location of components on old- and new-style AutoSet processor boards. If your AutoSet calibration kit has the current version 2.0 processor board installed, refer to Figure 3-17, page 79.

1. Open the cover of the AutoSet 2-Channel calibration unit enclosure.

2. For one-cell calibration, take one calibration module and plug the connector on the cable into the terminal block labelled "Left Input" (TB6) at the lower right of the AutoSet processor board. The connector plugs in only one way. If a connector is already plugged into this slot, remove it before plugging in the connector from the calibration module.

   Connect a jumper wire between terminals 2 and 3 on one of the five-pin connectors supplied with the calibration kit, and plug the connector into the terminal block labelled "Right Input" (TB7) at the lower right of the AutoSet processor board.

NOTICE

You can use either the left or right strain link input for one-cell calibration. The unused connector in the other slot must have the jumper wires connected.

   For two-cell calibration, plug the connector on the cable from the other calibration module into the terminal block labelled "Right Input" (TB7).

3. Screw the connector on one of the load cell cables into the connector on one of the load cells. Screw the connector at the other end of the cable into the connector on the calibration module. If you are using two load cells, repeat this step for the other load cell.

⚠ **WARNING**

ELECTRIC SHOCK HAZARD

If the AutoSet 2-Channel calibration unit does not have a plug and you wire it to a power source, make sure power at that outlet is off before you connect the wires.

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

⚠ **WARNING**

MAKE SURE POWER SUPPLY COVER IS IN PLACE ON OLD PROCESSOR BOARDS

On some old-style calibration kit processor boards, there is a cover on the power supply, which helps to prevent shock when personnel are working inside the enclosure with the power on. If you remove this cover to connect 115 or 230 Vac wires, make sure to replace the cover before applying power. The power supply is located at the top center of the processor board.

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

4. Plug in the AutoSet calibration unit. If your unit does not have a plug, connect AC wiring as shown in *Connecting AC and Stop Circuit Wiring,* page *33*. Note that the terminal block for AC input is labelled TB3 on the AutoSet 2-Channel calibration kit processor board, not TB103 as on the AutoSetPAC processor board.
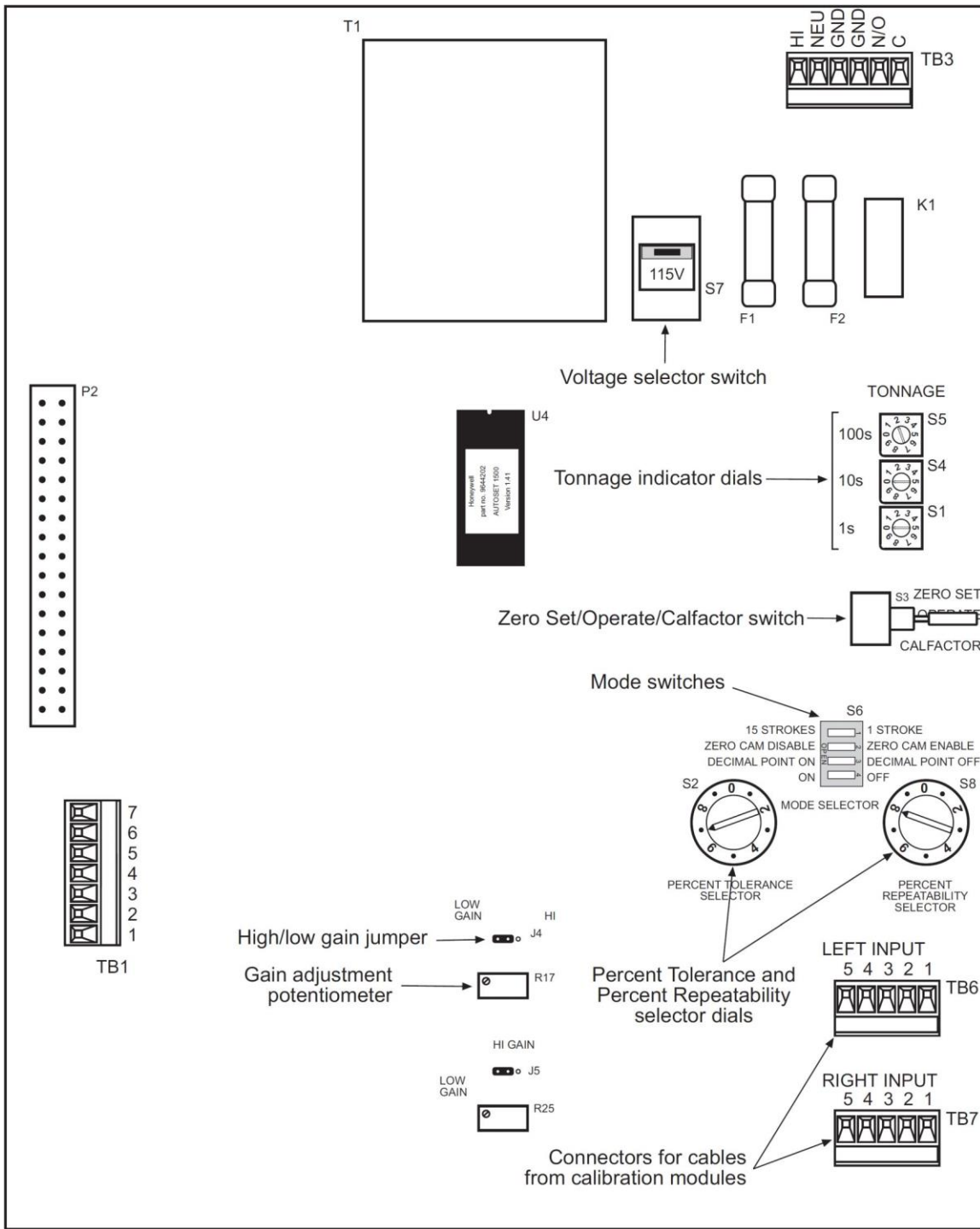
Figure 3-15. AutoSet 2-Channel Calibration Kit Processor Board: Old Style
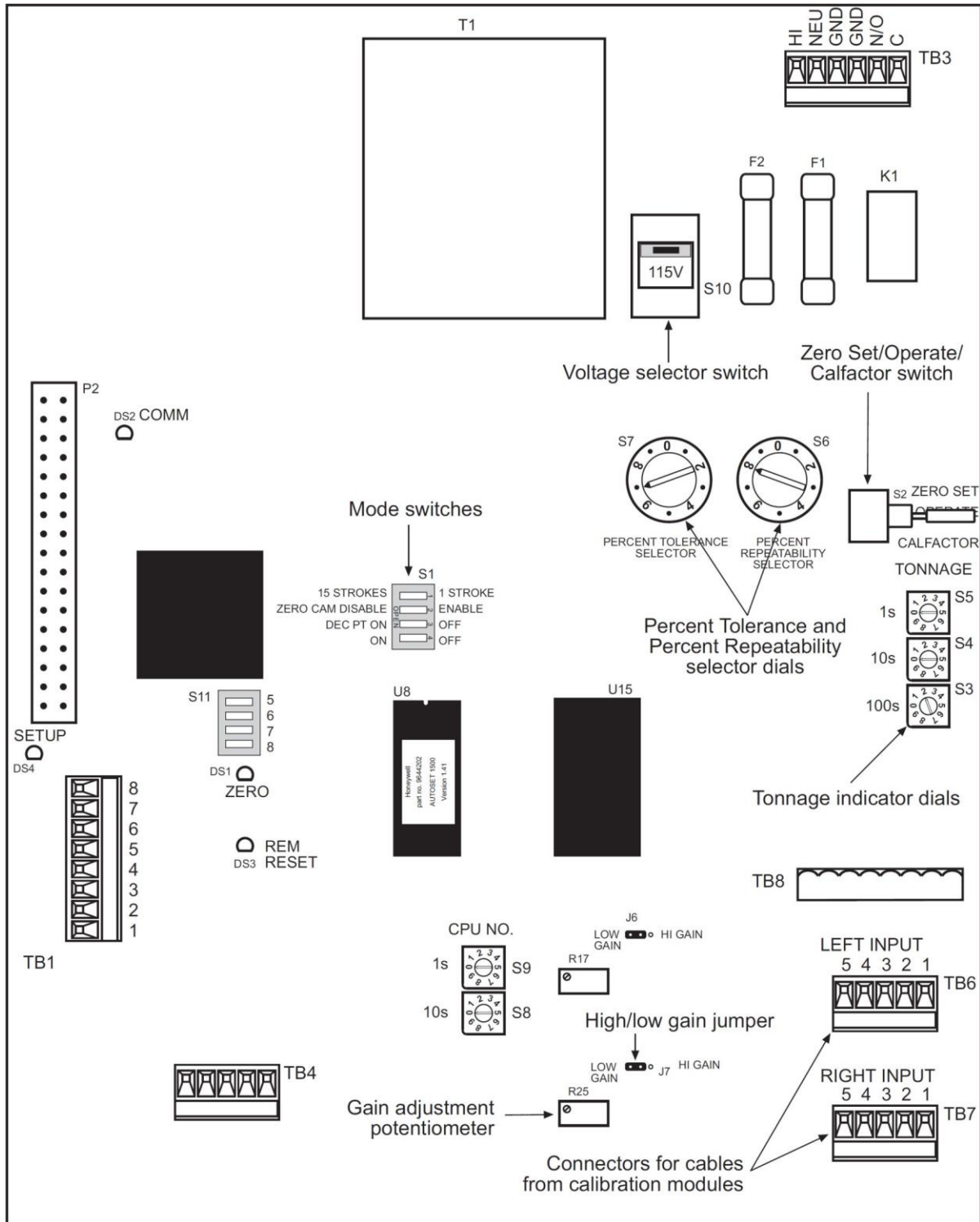
Figure 3-16. AutoSet 2-Channel Calibration Kit Processor Board: New Style
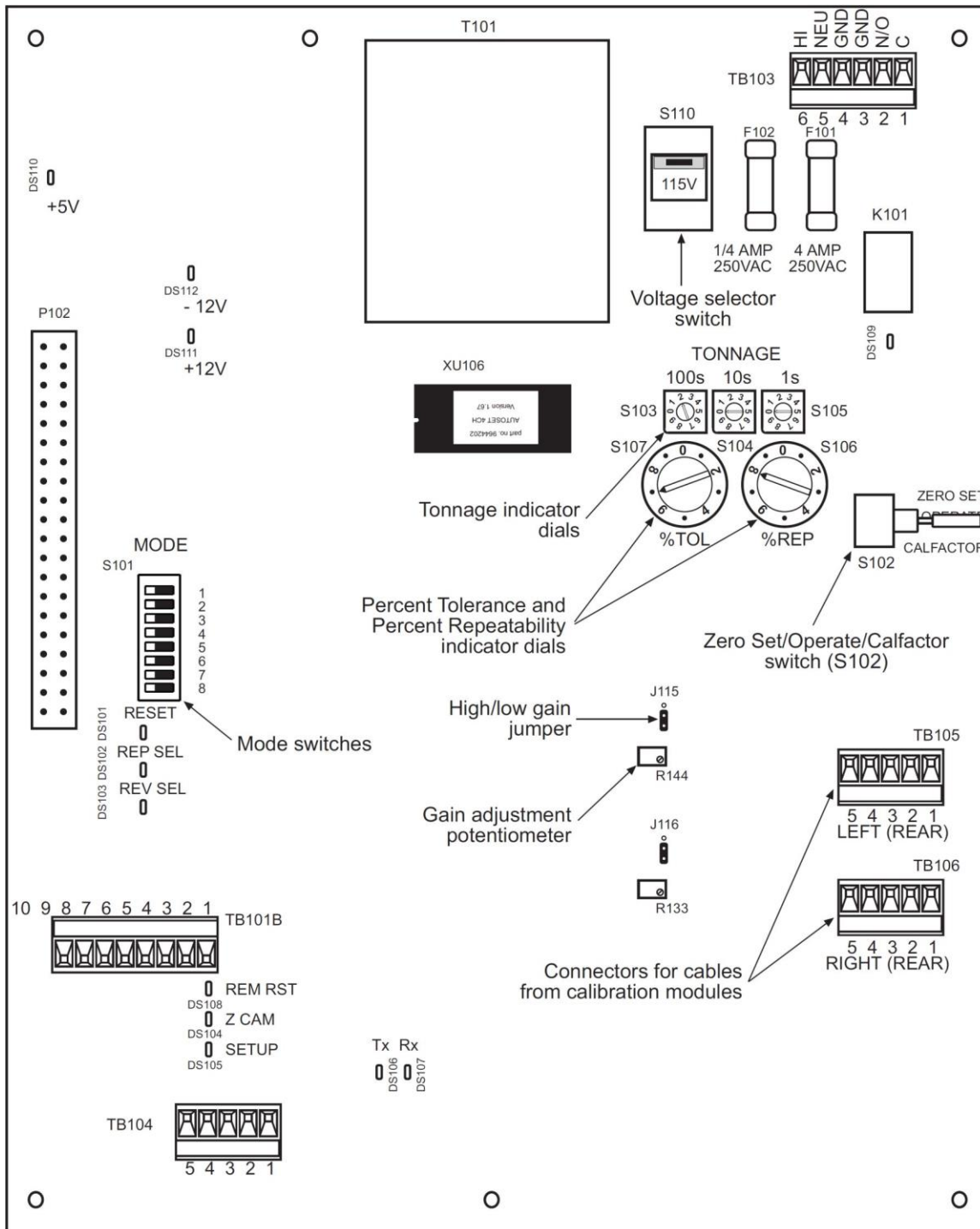
Figure 3-17. AutoSet 2-Channel Calibration Kit Processor Board: AutoSet V2.0 Board

5. Check the AutoSet displays. The Load LED displays should show 0's or other numbers. The Setpoint displays should show either numbers, dashes (- - -), or the message "HI" or "LO."

6. If the displays are not active, turn off power to the AutoSet. Re-check the connections for power and strain links. Make sure that the voltage selector switch (S7 in Figure 3-15, S10 in Figure 3-16) is set correctly (either 115V or 230V), and switch S3 (Figure 3-15) or S2 (Figure 3-16) is

set to "ZERO SET." Then turn power on again and check the displays. If the displays are still inactive, call Wintriss Tech. Support.

7. Locate the dial indicators labelled "TONNAGE" (S1, S4, and S5 in Figure 3-15, S3, S4, and S5 in Figure 3-16) on the right side of the AutoSet processor board.

8. Each dial indicator has an arrow you can turn, using a small screwdriver, to the numerical setting you want. The indicator labelled "100s" represents the hundreds position in the full-scale tonnage setting, the indicator labelled "10s" represents the tens position, and the indicator labelled "1s" represents the ones position. To set full-scale tonnage to 200, for example, as illustrated in Figure 3-18, you would turn the "100s" indicator to "2," and turn the "10s" and "1s" indicators to "0."
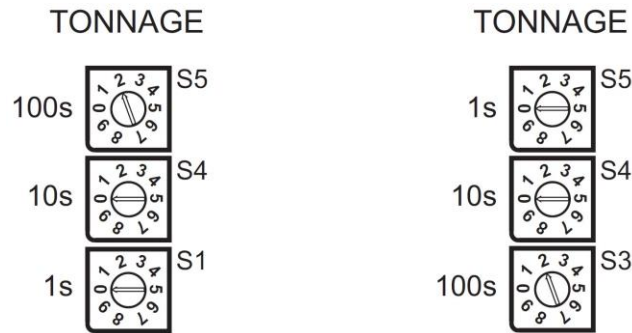
Figure 3-18. Tonnage Dial Indicators: Old-style Board (Left), New-style Board (Right)

9. Set the Tonnage dial indicators to twice the full-scale tonnage of one load cell.

NOTICE

Even if you are using two load cells for calibration, you still set the Tonnage dial indicators to twice the full-scale tonnage of one load cell.

For tonnages greater than 999 (i.e., with more than three digits), set the dials to one-tenth of the value you want. For example, to indicate a full-scale tonnage of 1200 tons, set the dials to "120" (i.e., 120 x 10 = 1200).

AutoSet Load LED displays format tonnage readings based on two factors: the full-scale tonnage you have specified on the dial indicators and the position of switch #3 on the Mode switch block (S6 in Figure 3-15, S1 in Figure 3-16). Figure 3-19, page 80, shows the Mode switch block on old-style AutoSet 2-Channel calibration kit processor boards. The switch block on new-style boards is identical but labelled differently.
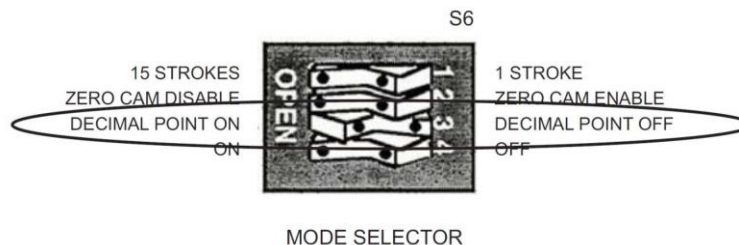
Figure 3-19. Mode Switch #3 Set to "Decimal Point Off" Position (Old-style Processor Board)

When switch #3 is in the OPEN position, AutoSet LED displays include a decimal place. When switch #3 is in the CLOSED position, no decimal point is shown. The decimal point is not active for full-scale tonnage settings between 201 and 2-Channel tons. Table 3-3 summarizes your tonnage display options.

Table 3-3. AutoSet Load Cell Tonnage Display Formats

Load Cell Tonnage Range	Mode Switch #3 Setting	Decimal Point ON/OFF	Channel Load LED Display Format
200 tons or less	OPEN	ON	Up to 100 tons: tenths of a ton (e.g., 6.0, 45.5., 99.9)
	CLOSED	OFF	Whole tons (e.g., 6, 46, 100)
201 to 1500 tons	CLOSED	OFF	Whole tons (e.g., 125, 400, 750)
More than 1510 tons	OPEN	ON	Tenths of a ton (e.g., 5.5 = 55 tons, 25.0 = 250 tons, 99.9 = 999 tons)
	CLOSED	OFF	Whole tons (e.g., 6 = 60 tons, 25 = 250 tons, 100 = 1000 tons)

10. Set Mode switch #3 for the display option you want, referring to Figure 3-19 and Table 3-3.

11. Power down the AutoSet calibration kit, then back up to reset the unit and activate your tonnage and decimal point settings.

12. Move the lever on the three-position switch labelled "S3" on old-style boards (see Figure 3-15) or "S2" on new-style boards (see Figure 3-16) to the "ZERO SET" position, and check the channel Load LED displays on the AutoSet front panel.

    If you are using one load cell for calibration, the value shown in the left Load display must be between +50 and -50. If you are using two load cells, the number in both left and right Load displays must be between ±50.

    If the Load displays are not within this range, there is a problem with your calibration unit. Call Wintriss Tech. Support for assistance.

13. Move the lever on switch S3 or S2 to the "CALFACTOR" position.

14. Locate the two load cell gain adjustment potentiometers labelled R17 and R25, which are to the left of the strain link inputs at the bottom center of the enclosure. A tiny screw protrudes from the upper left corner of each potentiometer (see Figure 3-20, page 82).

adjusting screw

Figure 3-20. Load Cell Gain Adjustment Potentiometer with Adjustment Screw

15. If you are using one load cell for calibration, turn the screw on gain adjustment potentiometer R17 clockwise or counterclockwise until the left channel Load LED display reads 157±2.

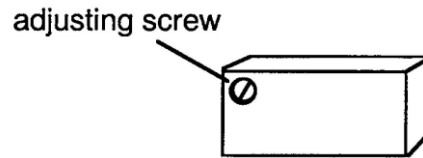   If you are using two load cells for calibration, turn the screws on both gain adjustment potentiometers (R17 and R25) until the displays on both channels read 157±2.

    To calibrate the press in metric tons, set the left channel to 173±2 for one load cell or both left and right channels to 173±2 for two load cells.

16. Move the lever on switch S3 or S2 to the "OPERATE" position. Both left and right channel Load LED displays should now read zero (0) tons.

17. Locate the Percent Tolerance Selector dial, labelled "S2" on old-style boards (see Figure 3-15), "S7" on new-style boards (see Figure 3-16).

    Locate the Percent Repeatability Selector dial, labelled "S8" on old-style boards (see Figure 3-15), "S6" on new-style boards (see Figure 3-16).

    Set both dials to the zero (0) position, then reset the calibration unit by pressing the RESET button (AutoSet 2-Channel) or turning the DISPLAY switch to "RESET" (AutoSet 2-Channel Plus) and holding for at least two seconds.

    Setting both percent tolerance selector dials to zero (0) disables AutoSet's automatic setpoint function.

NOTICE

Setpoints LED displays will show numeric readings after the unit is reset. Ignore these readings. Only the Load LED displays are used in calibration.

Applying Full-scale Tonnage to the Calibration Kit

To apply full-scale tonnage to the AutoSet 2-Channel calibration kit, perform the following steps:

1. Make sure that the die is removed from the press and that any bolster/bed openings or ram holes are covered with a plate or plates rigid enough to prevent flexing. Wintriss strongly recommends using 1"- to 2"-thick steel plates, or parallels, above and below the load cells to distribute the load evenly on the bed and ram. Even load distribution helps to improve calibration accuracy and linearity (see *Checking Linearity*, page 89).

2. Bring the ram to bottom dead center (BDC) and turn off power to the press. Use a dial indicator, if necessary, to make sure that the press is at 180°.

3. Place the load cell(s) and parallels under the connecting rod(s). Make sure load cells are centered under the connecting rods to ensure even load distribution on the press frame.

4. Determine the load you will put on the load cells. This value should be equal to the tonnage you normally use when making parts. For example, if you usually run between 60–90% of press capacity, then calibrate the press at 75% of capacity. This setting will yield the most accurate tonnage readings within this range. Make sure that you do not calibrate the press at less than 50% of capacity. Also, make sure not to exceed press capacity.

NOTICE

DO NOT STOP THE RAM ON THE LOAD CELLS. ALWAYS CYCLE THE PRESS THROUGH A COMPLETE STROKE.

---

5. Power up the press, and cycle the press through one stroke.

CAUTION

DO NOT STICK PRESS ON BOTTOM

Do not overload the press by lowering the ram too quickly. You may stick the press on the bottom. Increase the load gradually. Unlike the softer material used for making parts, load cells are extremely stiff and provide no compressive cushion to bring the ram through bottom dead center if you over-adjust.

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

---

6. Lower the ram 0.003" or 0.004" (0.076–0.102 mm) with your press's shut height adjustment, lock the shut height, and cycle the press again.

7. Repeat step 6 until the readout on your calibration unit indicates that contact on the load cell(s) is being made at BDC.

8. Continue to cycle the press and adjust the ram downward, locking the shut height after each adjustment, until the Load LED displays on your calibration unit show the tonnage you determined in step 4.

9. If you are using two load cells, make sure both Load LED readouts display equal tonnage. If Load readings disagree by more than ± 2%, add shim stock to the load cell that shows the lower tonnage. Cycle the press, and recheck tonnage. Continue to add shim stock until the tonnage shown in both Load displays is equal.

10. Check to make sure that the load cells, shims, and parallels do not move during calibration, using adhesive tape or equivalent, if necessary, to hold them in place. If you reposition any of these items, make sure to double-check the tonnage shown on the Load LED display(s) on the calibration kit before proceeding with the next adjustment.

Setting Full-scale Tonnage on Your AutoSetPAC

NOTICE

Wintriss recommends that AutoSetPAC be calibrated at the tonnage at which the press will normally operate. If you usually run between 60-90% of press capacity, calibrate at 75% of capacity. For example, if the press is a 100-ton press, calibrate for 75 tons. Do not calibrate at less than 50% of press capacity.

To set your AutoSetPAC to the full-scale tonnage of your press, do the following:

---

1. On the SmartPAC Main Initialization Menu, select the TONNAGE/WAVEFORM item, and press ENTER. The Tonnage/Waveform Initialization Menu (see Figure 3-4) displays.

2. Select "SET PRESS CAPACITY," and press ENTER to display the Numeric Entry window (see Figure 3-21).
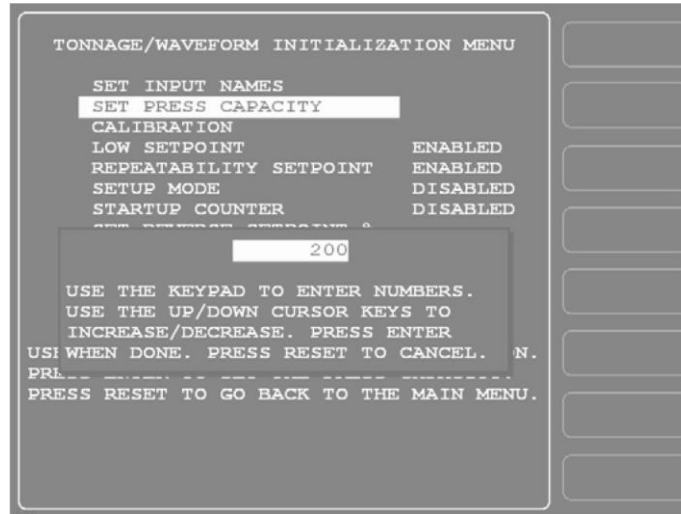
Figure 3-21. Tonnage/Waveform Initialization Menu with Numeric Entry Window Displayed

3. Key in a value (maximum is 3000 tons), following the directions in the window, and press ENTER. You are returned to the Tonnage/Waveform Initialization Menu.

AutoSetPAC tonnage display formats are shown in Table 3-4.

Table 3-4. AutoSetPAC 2-Channel and 4-Channel Tonnage Display Formats

Tonnage Range AutoSetPAC 2-Channel	Tonnage Range AutoSetPAC 4-Channel	Channel Load Display Format
200 tons or less	400 tons or less	Up to 100 tons: tenths of a ton (e.g., 6.0, 45.5., 99.9) From 100 to 120 tons: whole tons (e.g., 100, 109, 120)
More than 200 tons	More than 400 tons	Whole tons (e.g., 125, 400, 750)

Adjusting AutoSetPAC To Read the Correct Tonnage

To adjust the tonnage displayed in AutoSetPAC so it agrees with the value(s) shown on the calibration unit, perform the following steps:

1. Select CALIBRATION on the Tonnage/Waveform Initialization Menu to display the Calibration screen (see Figure 3-22).
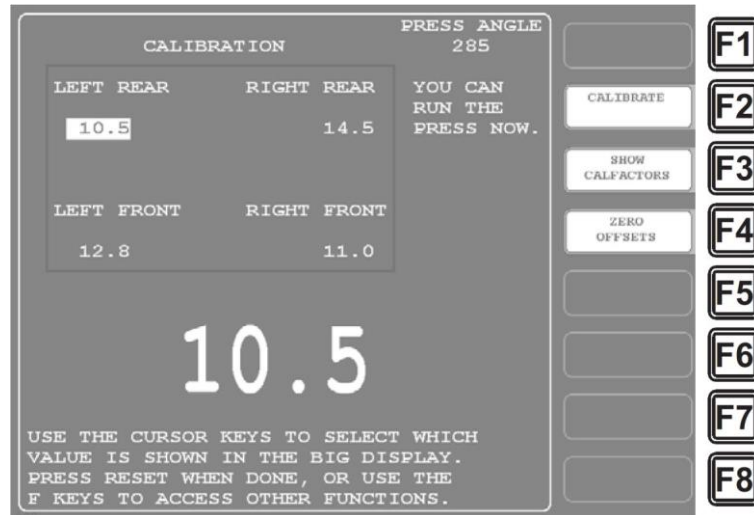
Figure 3-22. Calibration Screen

2. Familiarize yourself with the gain adjustment potentiometers and high/low gain jumpers to the left of the strain link inputs at the bottom of the AutoSetPAC processor board (see Figure 2-6 or Figure 2-7). Table 3-5 shows the processor board labels that identify potentiometers and jumpers for each AutoSetPAC model.

Table 3-5. Gain Adjustment Potentiometer and High/Low Gain Jumper Identifiers

AutoSetPAC Model	Strain Link (Input Connector)	Gain Adjustment Potentiometer	High/Low Gain Jumper
2-Channel	Left (TB105)	R144	J115
	Right (TB106)	R133	J116
4-Channel	Left Rear (TB105)	R144	J115
	Right Rear (TB106)	R133	J116
	Left Front (TB107)	R161	J117
	Right Front (TB108)	R173	J118

Potentiometers control the factor by which incoming strain link signals are amplified to make tonnage readings on your AutoSetPAC match tonnage readings on the calibration unit. You adjust each potentiometer by turning the small screw in its lower right corner (see Figure 3-23, which shows the potentiometer and jumper for the Left (Rear) strain link input). The potentiometer screw has a 12-turn limit.

Jumpers control the portion of the range within which strain link signals are amplified. Jumpers are factory set to "LO," which selects the low end of the amplification range (see Figure 3-23). You can change the jumper setting to "HI," which selects the high end of the amplification range, by removing the jumper from the two lower pins and placing it over the two upper pins.
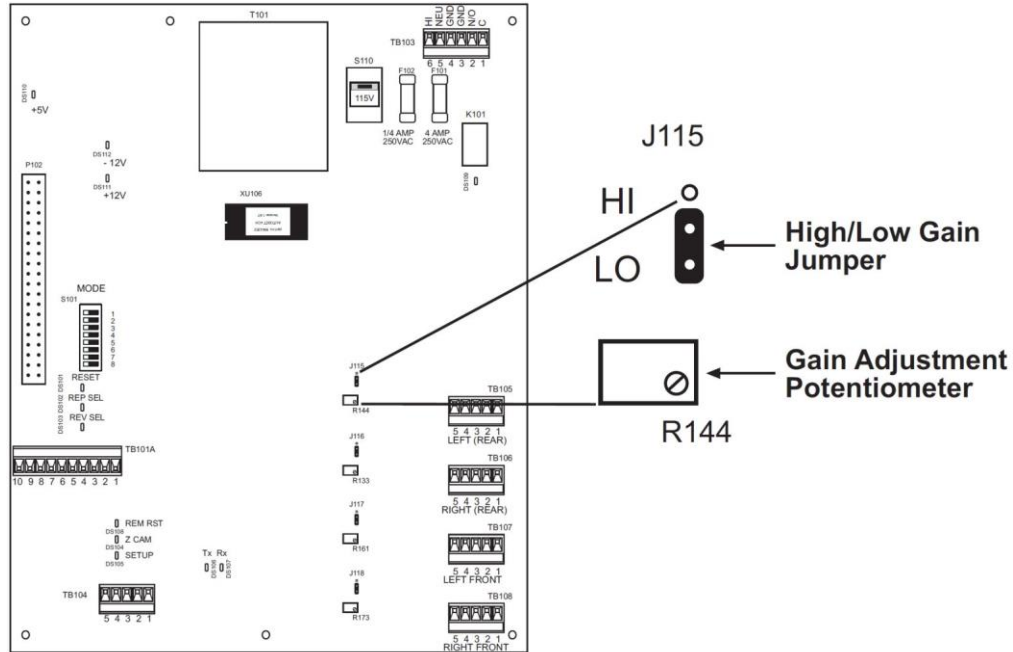
Figure 3-23. AutoSetPAC 4-Channel Processor Board: High/Low Gain Jumper and
Gain Adjustment Potentiometer for Left Rear Strain Link

3. Cycle the press and compare the reading in the "Left" (AutoSetPAC 2-Channel) or "Left Rear"
    (AutoSetPAC 4-Channel) channel display on the Calibration screen with the tonnage displayed
    on the calibration unit.

    In comparing tonnages, you must factor in the number of load cells used during calibration and
    the number of strain link channels on your AutoSetPAC. Table 3-6 shows the ratio of each Load
    reading on a calibrated AutoSet to each calibration unit display. Ratios may be 1/1, 1/2, or 1/4.

Table 3-6. AutoSetPAC Load Readings: Ratio of Calibration Unit Readings

No. of Load Cells	No. of Active Displays on Cal. Unit	AutoSetPAC 2-Channel Displays (2): Ratio of Cal. Unit	AutoSetPAC 4-Channel Displays (4): Ratio of Cal. Unit
1	1	1/2 of cal. unit	1/4 of cal. unit
2	2	Same as cal. unit	1/2 of cal. unit

4. If the tonnages displayed on your AutoSetPAC and on the calibration unit differ, turn the
    adjustment screw on gain potentiometer R144 clockwise to increase the tonnage reading on the
    Left or Left Rear strain link or counterclockwise to decrease the tonnage reading.

NOTICE

PRESS MUST BE STROKED AFTER EACH POTENTIOMETER ADJUSTMENT
You must stroke the press after each adjustment of the potentiometer. Stroking the press clears the previous tonnage reading and refreshes the Calibration display with new values.

---

5. Continue cycling the press and adjusting potentiometer R144 until the tonnage shown in the "Left" (AutoSetPAC 2-Channel) or "Left Rear" (AutoSetPAC 4-Channel) channel display in AutoSetPAC matches the tonnage shown on the calibration unit. Then go to step 8.

NOTICE

Tonnage values may not display immediately on your AutoSetPAC as you make potentiometer adjustments. However, they will appear eventually if you keep turning the potentiometer screw and cycling the press.

---

6. If the channel display on the Calibration screen stops incrementing, indicating that you have reached the 12-turn limit on the adjustment screw, and you have not been able to increase the tonnage on your AutoSetPAC so it matches the tonnage on your calibration unit, you must change jumper J115 to its "HI" setting. To do so:

    • Power down SmartPAC.

    • Remove the jumper from the two lower pins and place it over the two upper pins (see Figure 3-23).

    • Power up SmartPAC.

    • Cycle the press to display a tonnage reading

NOTICE

When you cycle the press after repositioning a jumper, a fault message may display on the Calibration screen, indicating that tonnage is now over 120% of full scale. To clear this error, press RESET. When the error is cleared, the reading shown for that strain link on the Calibration screen may be much higher than the tonnage shown on your calibration unit.

---

7. Turn the adjustment screw on potentiometer R144 counterclockwise and cycle the press again. Compare tonnages on your AutoSetPAC and on the calibration unit. Continue adjusting the potentiometer downward and cycling the press until the tonnage on your AutoSetPAC is identical to the tonnage on the calibration unit.

NOTICE

If the fault message indicating that tonnage is above 120% of full scale continues to appear as you make potentiometer adjustments and cycle the press, press RESET each time to reset AutoSetPAC.

---

8. Cycle the press and compare the reading in the "Right" (AutoSetPAC 2-Channel) or "Right Rear" (AutoSetPAC 4-Channel) channel display on the Calibration screen with the tonnage shown on the calibration unit, and repeat steps 4 through 7, making adjustments on potentiometer R133 and jumper J116.

---

9. If you are calibrating an AutoSetPAC 4-Channel unit, cycle the press and compare AutoSetPAC and calibration kit tonnage readings for the "Left Front" and "Right Front" strain links, then repeat steps 4 through 7 for each channel. Refer to Table 3-5, page 86, for processor board labels identifying the gain potentiometer and high/low gain jumper for each strain link.

10. When you have finished adjusting the AutoSetPAC so its tonnage readings match those displayed on the calibration unit, press F3 (Show Calfactors) on the Calibration screen. The screen shown in Figure 3-24 displays.
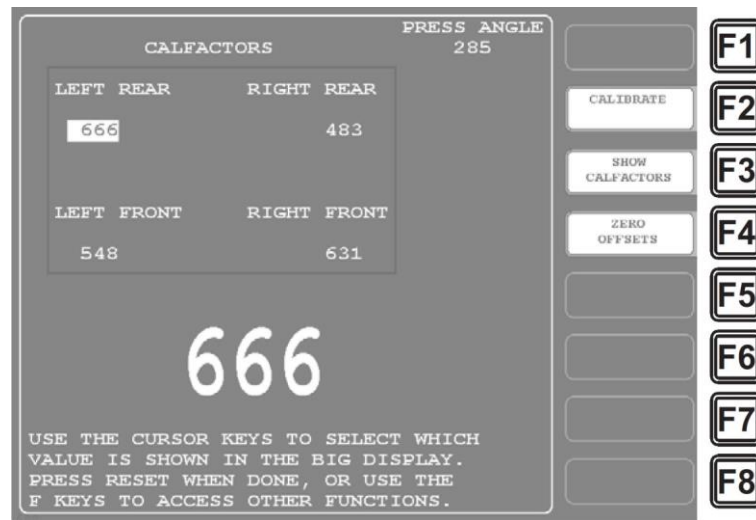

Figure 3-24. Calibration Screen: Calfactors Display

As shown in Figure 3-24, the caption at the top of the screen changes from CALIBRATION to CALFACTORS, and numbers between 40 and 960 are shown in the strain link channel displays. These numbers are the "calfactors," or calibration settings, for your AutoSetPAC.

11. Record the calfactor and high/low gain jumper setting for each strain link channel, two pairs of settings for AutoSetPAC 2-Channel, four pairs of settings for AutoSetPAC 4-Channel.

If you need to replace a processor board, you can use these settings to calibrate the new board without repeating the lengthy calibration process documented in this chapter. Simply access the Calibration screen in SmartPAC (Calibration view is the default), move high/low gain jumpers to the correct position, and adjust each potentiometer to the calfactor you have recorded.

12. Press RESET repeatedly to exit from the Calibration screen and return to the Main Initialization Menu. Your AutoSetPAC is now ready to use.

Checking Linearity

After you calibrate your AutoSetPAC, you can check to see whether tonnage readings increase proportionally with increases in load. For example, if AutoSetPAC reads 40 tons when 40 tons is applied to the load cells, it should read 80 tons when 80 tons is applied to the load cells. The proportional increase of tonnage readings with increasing load is called "linearity." Linearity is a good measure of how accurately tonnage is being recorded at different loads.

To check linearity, change the load on the press. For instance, if you calibrated AutoSetPAC at 75% of press capacity, reduce the load on the load cells to about 45%. If you calibrated at 50%, decrease the load to about 30%. When you compare the new load readings on the AutoSetPAC with the load displays on the calibration unit, readings should continue to be identical.

If tonnage readings on the AutoSetPAC and calibration unit disagree at the new load settings, there may be a problem with the positioning of your strain links, or the press may be experiencing twisting forces. Consult your service representative or contact Wintriss Tech. Support. Note, however, that perfect linearity is unachievable. Typically, tonnages are accurate within 5% to 10% at 20-80% of press capacity.

Final Checkout

NOTICE

The Final Checkout needs to be performed after installation (see Chapter 2) and calibration procedures have been completed and before you run the press. Final Checkout ensures that AutoSetPAC will stop the press properly during a tonnage fault.

To perform final checkout, follow these steps:

1. Install a test tool on your press.

2. On the Tonnage Monitor Programming Menu, set the REPEATABILITY % item to 1%, referring to *Making Tonnage Monitor Settings*, page 96.

3. Run a few parts. The 1% repeatability setting should generate a repeatability fault.

4. Check to make sure that the press top stops and that a repeatability fault message displays on the SmartPAC front panel (see Figure 6-1, page 121, which shows an example of a fault message).

5. If a fault message displays but the press does not top stop, there is a problem in your top-stop circuit. Recheck all wiring and trace the cause of the problem. Do not continue with this procedure until the press top stops when you trip the repeatability setpoint.

6. If the press is working properly, clear the fault by pressing the RESET or EXIT key on the SmartPAC front panel.

Your AutoSetPAC is now ready for use. Refer to Chapter 4 to learn how to program setpoints and make other settings for your load analyzer.

Chapter 4   Using AutoSetPAC in Program Mode

This chapter shows you how to make the settings that AutoSetPAC uses to calculate setpoints. You make these settings on the Tonnage Monitor Programming screen in SmartPAC Program mode. The chapter also shows you how to copy Program settings from one job to the next, change Program settings, and recalculate setpoints. Instructions are also provided for adjusting setpoints when this capability is locked out of Run mode.

NOTICE

"SmartPAC" refers to original SmartPAC, SmartPAC 2, and SmartPAC PRO, unless otherwise indicated.

NOTICE

REFER TO SMARTPAC USER MANUAL

Instructions for creating, copying, deleting, and loading tools are provided in Chapter 5 of your SmartPAC user manual. For help in using the keyboard, refer to Chapter 3 of the manual.

NOTICE

USING SMARTPAC HELP

If you need help with a Program mode screen, press the HELP or ? key when that screen is displayed.

AutoSetPAC's Setpoint Calculation Process

AutoSetPAC creates setpoints automatically based on the following settings you make on the Tonnage Monitor Programming Menu in Program mode:

- Sample period

- High setpoint percentage

- Low setpoint percentage

- Repeatability setpoint percentage

The sample period is the number of strokes during which AutoSetPAC collects tonnage information for calculating setpoints, using the highest measured load as a reference tonnage. During the sample period, setpoints are maintained at 120% of the full-scale capacity of the press to provide overload protection.

NOTICE

AUTOSETPAC SETPOINTS NEVER EXCEED 120%
AutoSetPAC will not create setpoints greater than 120% of the full-scale capacity of the press.

High setpoint percentage is the percentage above the reference tonnage at which AutoSetPAC establishes high tonnage setpoints. It is calculated using the following formula:

High setpoint = Highest measured load + (highest measured load x high setpoint percentage)
Low setpoint percentage is the percentage below the reference tonnage at which AutoSetPAC establishes low tonnage setpoints. It is calculated using the following formula:

Low setpoint = Highest measured load - (highest measured load x low setpoint percentage)
Repeatability setpoint percentage is the percentage of the reference tonnage at which AutoSetPAC establishes repeatability setpoints. It is calculated as follows:

Repeatability setpoint = Highest measured load x repeatability setpoint percentage
AutoSetPAC samples the load at each strain link simultaneously, selecting the highest measured load at that strain link as the reference tonnage. Tonnage is sampled at two strain links in AutoSetPAC 2-Channel and at four strain links in AutoSetPAC 4-Channel.

Example

An AutoSetPAC 2-Channel load analyzer is installed on a 100-ton press. The high setpoint percentage is set to 15%, the low setpoint percentage to 25%, and the repeatability setpoint percentage to 5%. The sample period is set to 15 strokes.

The highest load measured during the sample period on the left strain link is 38 tons, as shown in Figure 4-1. Setpoints for this strain link are calculated as follows:

High setpoint left = 38 tons + (38 tons x .15) = 38 + 5.7 = 43.7 tons

Low setpoint left = 38 tons - (38 tons x .25) = 38 - 9.5 = 28.5 tons

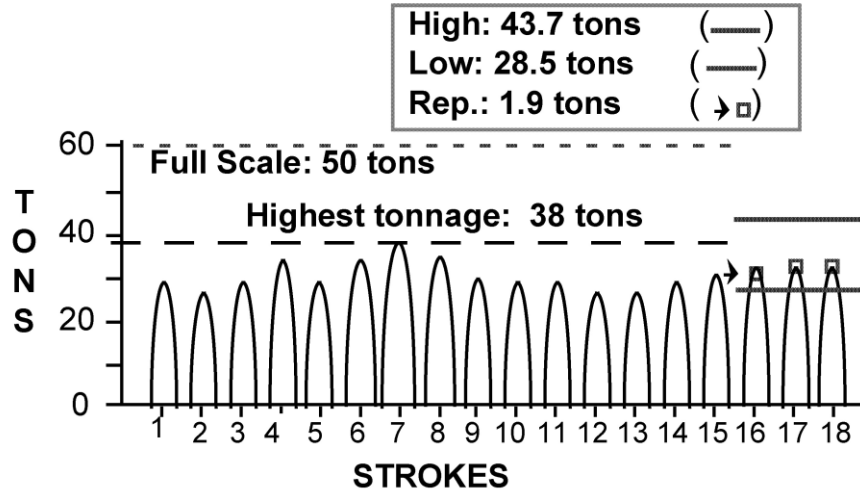*Repeatability setpoint left = 38 tons x .05 = 1.9 tons*

Figure 4-1. Tonnages Produced on Left Strain Link during Sample Period: Example

Reverse setpoints are calculated by multiplying the reverse setpoint percentage set in Initialization mode (see *Setting Reverse Setpoint % of Press Capacity*, page 66) by the full-scale tonnage of the press. Therefore, continuing our example, if the reverse setpoint percentage set in Initialization is 15%, the reverse setpoint for both channels would be 7.5 tons (15% of 50 tons, the full-scale tonnage of the press). Whenever the reverse setpoint is exceeded, a fault message displays on the SmartPAC front panel (see Figure 6-1, page 121).

AutoSetPAC displays the results of its high, low, and repeatability setpoint calculations on the View/Adjust Setpoints screen in Program and Run modes (see *Viewing and Adjusting Setpoints* sections in Chapter 4 (page 99) and Chapter 5 (page 109). High and low setpoints are displayed graphically on the Tonnage Bargraph View screen in Run mode (see page 108). Two setpoints are shown for AutoSetPAC 2-Channel and four setpoints for AutoSetPAC 4-Channel.

AutoSetPAC calculates setpoints whenever you perform the *Recalculate Setpoints* function (see *Recalculating Setpoints*, page 102 or page 112) or load a tool with a new high setpoint, low setpoint, or repeatability setpoint percentage. Setpoints are displayed after the sample period is completed. AutoSetPAC calculates new reverse setpoints whenever the reverse setpoint percentage or full-scale press capacity value is changed in SmartPAC Initialization.

Setpoints can be recalculated even when the press is running.

You can standardize tonnage monitor settings for all your tools, using SmartPAC's Copy Tool function (see *Copying Tonnage Monitor Settings*, page 98). If you want to use different settings for some of your dies, refer to *Changing Tonnage Monitor Settings*, page 99.

Startup Counter

The Tonnage Monitor Programming Menu also allows you to set the Startup Counter if this option has been enabled in Initialization mode (see *Disabling/Enabling AutoSetPAC Parameters*, page 66). The Startup Counter specifies the number of strokes to allow after startup of the press before AutoSetPAC begins to monitor tonnage or calculate setpoints. During the period defined by the specified number of strokes, AutoSetPAC disables high, low, and repeatability setpoints and suspends calculation of setpoints.

This setting can be used to allow high-speed presses to reach their normal operating speed before monitoring tonnage. The setting can also be used to allow any press to achieve stable tonnages before tonnage monitoring or setpoint recalculation begins.

AutoSetPAC maintains a high setpoint of 120% of press capacity to provide overload protection during the interval specified in the Startup Counter as it does during the sample period. The startup counter is not activated unless the press has been stopped at the top of its stroke for 10 or more seconds.

Accessing the Tonnage Monitor Programming Menu

The Tonnage Monitor Programming Menu is the screen on which you make settings for setpoint percentages, sample period, and startup counter (if enabled). To access this screen, do the following:

NOTICE

When switching between operating modes with the Program/Run key, make sure that SmartPAC is displaying the top-level screen in the current mode (i.e., Main Program Menu or Main Run Menu). To return to the top-level menu, press RESET repeatedly.

---

1. From the main menu of the current operating mode, turn the Program/Run key to "PROG." The Main Program Menu (see Figure 4-2) displays.


```
LOADED TOOL# 6160
DEMO TOOL 2
SENSORS DISABLED


       GO TO THE TOOL MANAGER
       SENSOR ENABLE/DISABLE & STATUS
       RECALCULATE SETPOINTS


USE THE CURSOR KEYS TO CHANGE SELECTIONS
PRESS ENTER TO ACCESS TOOL NUMBERS.
```
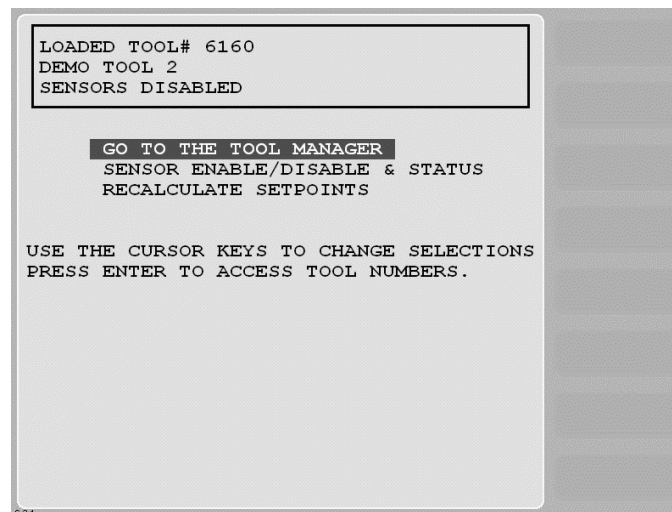
Figure 4-2. Main Program Menu

NOTICE

SELECT = HIGHLIGHT + ENTER
When this manual instructs you to select an item, you should highlight the item, and press ENTER.

---

2. Select "GO TO THE TOOL MANAGER" to display the Tool Manager screen (see Figure 4-3).
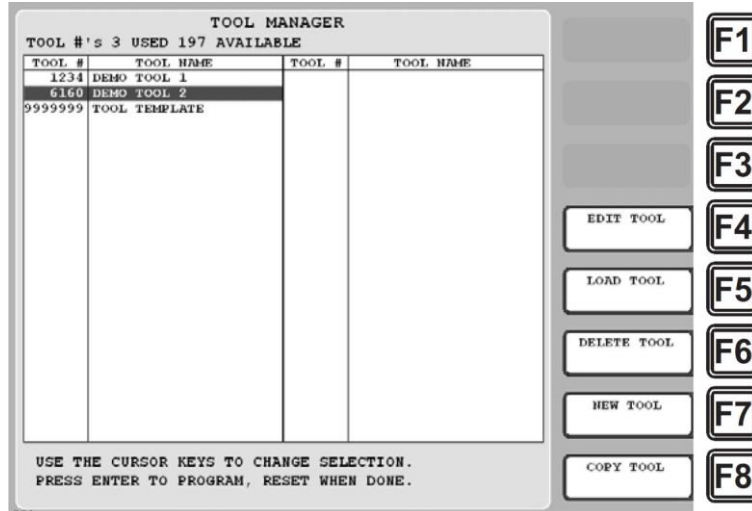
Figure 4-3. Tool Manager Screen

3. Highlight the tool you wish to Program, and press F4 (Edit Tool). The Tool Program Menu displays (see Figure 4-4).
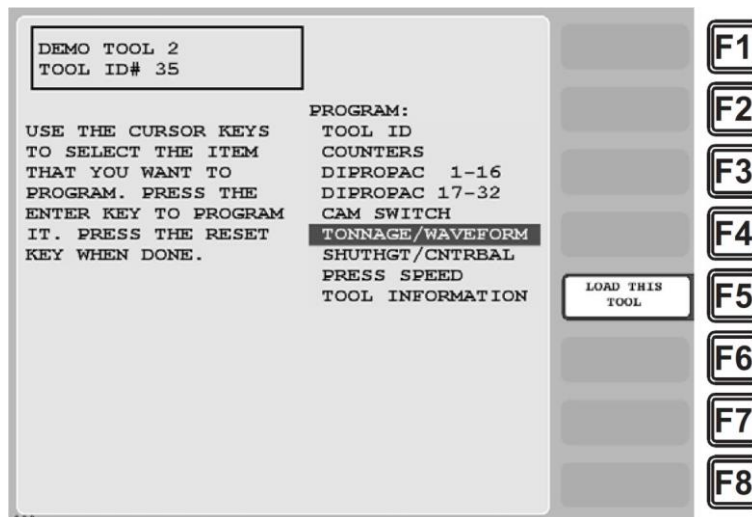
Figure 4-4. Tool Programming Menu

4. Select "TONNAGE/WAVEFORM." The Tonnage Monitor Programming Menu (see Figure 4-5) displays.
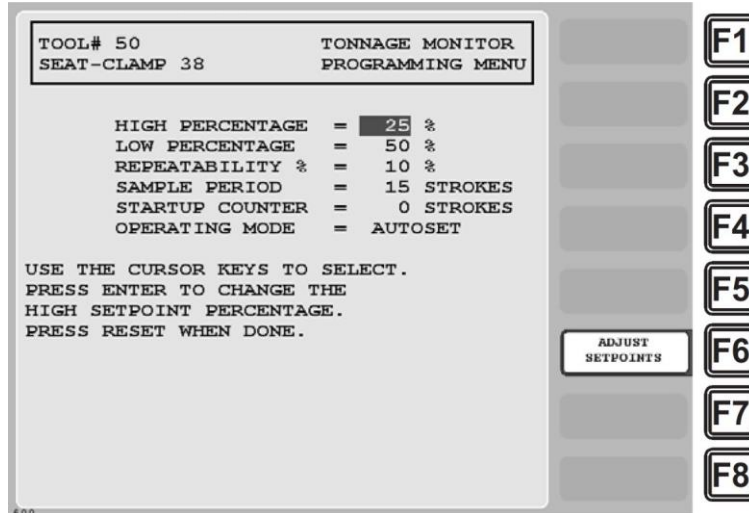
Figure 4-5. Tonnage Monitor Programming Menu

Making Tonnage Monitor Settings

To make settings on the Tonnage Monitor Programming Menu, perform the following steps, referring to Figure 4-5 and Table 4-1, page 97:

1. Make sure that the die is properly adjusted and ready to make parts.

2. With the cursor resting in the HIGH PERCENTAGE field, press ENTER to display the Numeric Entry window.

3. Key in the value you want, following the directions in the window, and press ENTER. The window disappears, and the value you keyed in is displayed in the HIGH PERCENTAGE field.

⚠ WARNING

AutoSetPAC will stop the press if tonnage exceeds 120% of press capacity even if the high, low, and/or repeatability setpoints have been disabled.

---

4. Move the cursor to the next field.

5. Perform steps 2 through 4 for the LOW PERCENTAGE, REPEATABILITY %, SAMPLE PERIOD, and STARTUP COUNTER (if enabled) items on the Tonnage Monitor Programming Menu.

6. When you are finished, press RESET to return to the Tool Program Menu.

Table 4-1. Tonnage Monitor Programming Menu Settings

Field	Settings
HIGH PERCENTAGE	The percentage above the reference tonnage at which you want AutoSetPAC to establish high tonnage setpoints. Valid range: 1% to 120%. Zero percent (0%) setting disables setpoint. Suggested initial setting: 25%.
LOW PERCENTAGE	The percentage below the reference tonnage at which you want AutoSetPAC to establish low tonnage setpoints. Valid range: 1% to 120%. Zero percent (0%) setting disables setpoint. Suggested initial setting: 50%.
REPEATABILITY %	The percentage of the reference tonnage at which you want AutoSetPAC to establish repeatability setpoints. Valid range: 1% to 120%. Zero percent (0%) setting disables setpoint. Suggested initial setting: 10%.
SAMPLE PERIOD	The number of strokes during which AutoSetPAC collects tonnage information for calculating setpoints. As a general rule, set the sample period to approximately 1/4 to 1/2 of the operating speed (SPM) of the press. For single-stroke operations, set the sample period to 1 stroke.
STARTUP COUNTER	The number of strokes after press startup during which AutoSetPAC disables high, low, and repeatability setpoints. This setting allows high-speed presses to reach a normal operating speed before AutoSetPAC begins to monitor tonnage. The setting is also used to allow presses to achieve a stable operating speed before AutoSetPAC recalculates setpoints. This setting is activated only when the press has been stopped at the top of its stroke for 10 seconds or more. Maximum value: 255 strokes.

Loading Tonnage Monitor Settings

When you have finished making tonnage monitor settings for a tool, you must load the tool to make those settings effective. To do so, perform the following steps:

1. On the Tool Programming Menu (see Figure 4-4), press the F5 (Load This Tool) function key. The warning message shown in Figure 4-6 displays.

```
        WARNING!!         WARNING!!
ANCILLARY EQUIPMENT MAY OPERATE
WHEN THIS TOOL IS LOADED. WARN
ALL PERSONNEL TO STAND CLEAR

   PRESS ENTER TO LOAD THIS TOOL.
      PRESS RESET TO CANCEL.
```

Figure 4-6. Load Tool Warning Message

2. Press ENTER to load the tool. (Press RESET if you want to cancel.) The message shown in Figure 4-7 displays briefly; then you are returned to the Tool Program Menu.

```
TOOL NUMBER 6160
                .......IS BEING LOADED
```

Figure 4-7. Tool Loading Message

NOTICE

You can also load the tool from the Tool Manager screen (see Figure 4-3) by pressing F4 (Load Tool) with the desired tool selected.

Copying Tonnage Monitor Settings

Once you have established high, low, and repeatability setpoint percentages, you can use these settings for all other dies you run on the press, using the Copy Tool function on the Tool Manager screen. To copy one tool to another, do the following:

1. On the Tool Manager screen (see Figure 4-3), select the tool you want to copy, and press the F8 (Copy Tool) function key. A message and Numeric Entry window display above the Tool Manager screen, as shown in Figure 4-8.
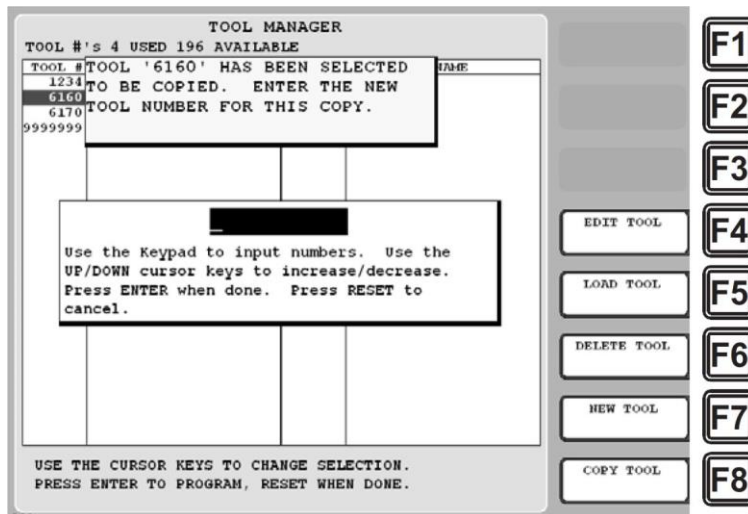

Figure 4-8. Tool Manager Screen with Copy Tool Message and
Numeric Entry Window Displayed

2. Key in a new tool number in the Numeric Entry window, and press ENTER. You are taken to the
    Tool Programming Menu (see Figure 4-4) with the tool number you specified in step On the Tool
    Manager screen displayed in the screen header in the upper left corner.

    Beneath the new tool number is displayed "COPY OF *TOOL NAME*," where *TOOL NAME* is the
    tool name of the tool you copied. "COPY OF TOOL NAME" is the default tool name assigned to
    copied tools.

3. To change the default tool name, select the TOOL NAME item on the Tool Programming Menu,
    and, when the Alphanumeric Entry window displays, key in the tool name you want to assign,
    following the directions in the window, and press F6. You are returned to the Tool Programming
    Menu with the tool name you entered displayed in the screen header beneath the tool number.

Changing Tonnage Monitor Settings

There may be situations in which you want to program a tool with settings different from those you
are using for your other tooling. For example, you may want to create tighter setpoints for some jobs
to provide greater protection for the press and tooling; on other jobs, looser setpoints may be desired
to prevent unnecessary faults and press shutdowns. You may want to change setpoints when a tool
runs at a much higher or much lower speed than a previous die, or generates a very different load.

To program a tool with new settings, perform the Making Tonnage Monitor Settings procedure,
page 96.

Viewing and Adjusting Setpoints

If the capability to adjust setpoints has been locked out from Run mode in SmartPAC Initialization
(see *Locking Run Mode Actions*, page 67), you can adjust setpoints for the currently loaded tool using
the F6 (Adjust Setpoints) function key on the Tonnage Monitor Programming Menu. Remember that
no setpoints exist for a new tool setup until that tool has been run long enough to satisfy the sample
period.

⚠ WARNING

Adjustments on the Adjust Setpoints screen can only be made to settings for the currently loaded
tool. If you are editing a tool that is not loaded, the caption for the F6 function key changes to
"View Setpoints," and the following message appears at the bottom of the screen that displays
when you press F6:

> THE TOOL NUMBER YOU HAVE
> SELECTED IS NOT LOADED. YOU
>
> CAN ONLY VIEW INFORMATION.
>
> PRESS RESET KEY WHEN DONE.

To adjust setpoints for the currently loaded tool, perform the following steps:

1. On the Tonnage Monitor Programming Menu, press the F6 (Adjust Setpoints) function key. A
    screen like the one shown in Figure 4-9, page 100, displays with high setpoint information shown
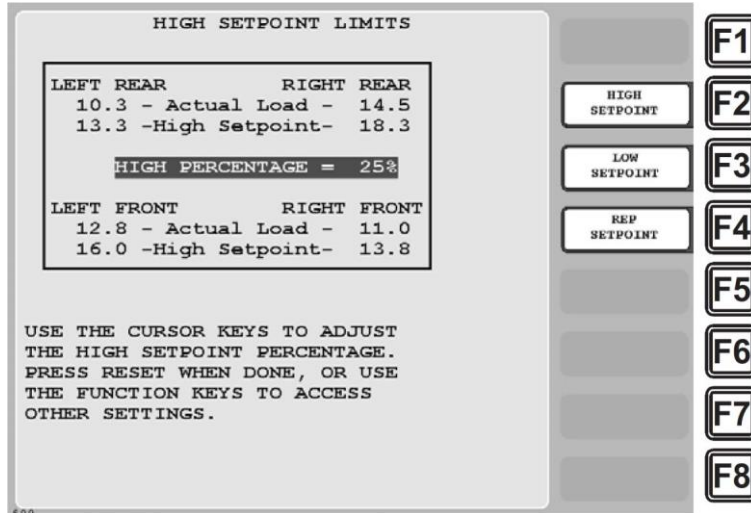   by default.

Figure 4-9. Adjust Setpoints Screen: High Setpoint Limits Display

2. The Adjust Setpoints screen allows you to make adjustments to the following Program tonnage
    settings:

    - High setpoint

    - Low setpoint

    - Repeatability setpoint

NOTICE

IMPORTANT

Adjustments you make on this screen change the Program settings for the currently loaded tool.
Original settings are lost.

High Setpoint Limits

High setpoint values are displayed by default when you select the ADJUST SETPOINTS item (see
Figure 4-9), or you can access them by pressing the F2 (High Setpoint) function key.

The High Setpoint Limits display shows the current high setpoint percentage, the most recently
calculated high tonnage setpoints for each strain link using the displayed percentage, and the actual
tonnage recorded for each strain link. Actual tonnages are updated on each stroke.

To adjust the high setpoint percentage up or down, press the Up Arrow ($\blacktriangle$) or Down Arrow ($\blacktriangledown$)
cursor key. Each keystroke increases or decreases the displayed value by 1 percent. As you adjust the
high setpoint percentage, the high tonnage setpoint values for each strain link are updated, allowing
you to see the results of your adjustments and to compare them with actual tonnage values.

To recalculate setpoints based on your changes, refer to *Recalculating Setpoints*, page 102.

Low Setpoint Limits

To display low setpoint values (see Figure 4-10), press the F3 (Low Setpoint) function key.
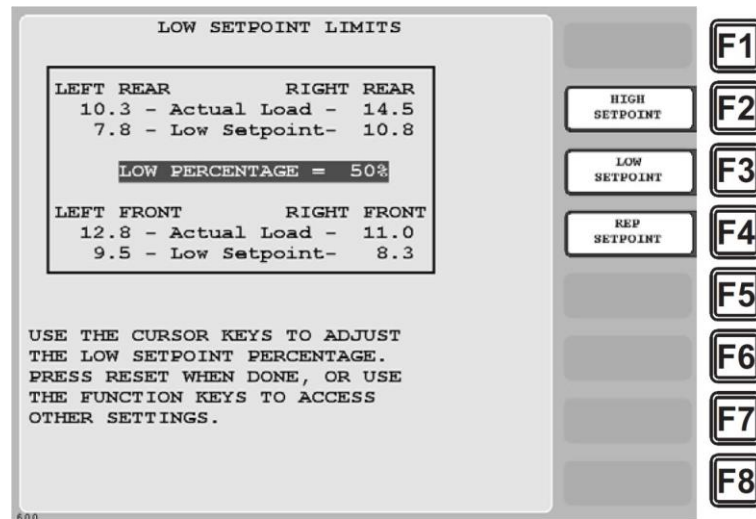

Figure 4-10. Adjust Setpoints Screen: Low Setpoint Limits Display

The Low Setpoint Limits display shows the current low setpoint percentage, the most recently calculated low tonnage setpoints for each strain link using the displayed percentage, and the actual tonnage recorded for each strain link. Actual tonnages are updated on each stroke.

To adjust the low setpoint percentage up or down, press the Up Arrow (▲) or Down Arrow (▼) cursor key. Each keystroke increases or decreases the displayed value by 1 percent. As you adjust the low setpoint percentage, the low tonnage setpoint values for each strain link are updated, allowing you to see the results of your adjustments and to compare them with actual tonnage values.

To recalculate setpoints based on your changes, refer to *Recalculating Setpoints*, page 102.

Repeatability Setpoint Limits

To display repeatability setpoint values (see Figure 4-11), press the F4 (Rep Setpoint) function key.

The Repeatability Setpoint Limits display shows the current repeatability setpoint percentage, the most recently calculated repeatability setpoints for each strain link using the displayed percentage, and the actual stroke-to-stroke tonnage variation recorded for each strain link.

The tonnage variation reading is the highest stroke-to-stroke tonnage variance recorded during the last **n** number of strokes, where *n* is the length of the sample period. For example, if the sample period is set to 15 strokes, AutoSetPAC collects tonnage variance information for the most recent 15 strokes.
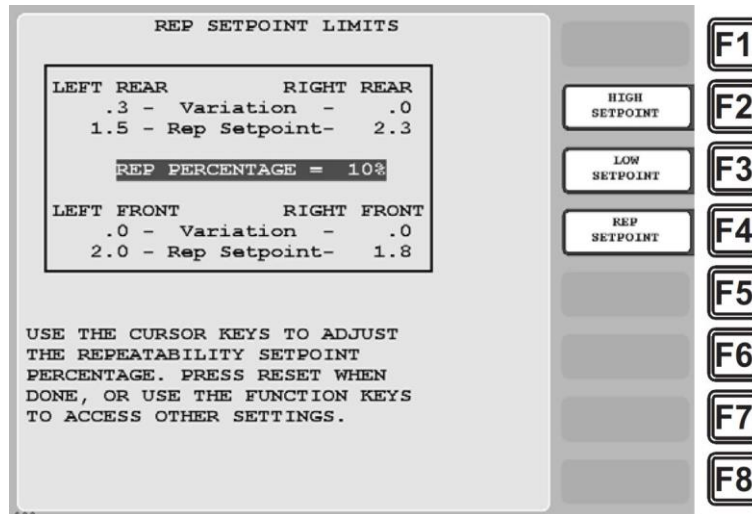
```
              REP SETPOINT LIMITS

    LEFT REAR              RIGHT REAR
        .3 -  Variation  -     .0
       1.5 - Rep Setpoint-    2.3

             REP PERCENTAGE = 10%

    LEFT FRONT             RIGHT FRONT
        .0 -  Variation  -     .0
       2.0 - Rep Setpoint-    1.8



    USE THE CURSOR KEYS TO ADJUST
    THE REPEATABILITY SETPOINT
    PERCENTAGE. PRESS RESET WHEN
    DONE, OR USE THE FUNCTION KEYS
    TO ACCESS OTHER SETTINGS.
```

F1
HIGH SETPOINT — F2
LOW SETPOINT — F3
REP SETPOINT — F4
F5
F6
F7
F8

Figure 4-11. Adjust Setpoints Screen: Repeatability Setpoint Limits Display

To adjust the repeatability setpoint percentage up or down, press the Up Arrow (▲) or Down Arrow (▼) cursor key. Each keystroke increases or decreases the displayed value by 1 percent. As you adjust the repeatability setpoint percentage, the repeatability setpoint values for each strain link are updated, allowing you to see the results of your adjustments and to compare them with actual stroke-to-stroke tonnage values.

To recalculate setpoints based on your changes, refer to *Recalculating Setpoints* (below).

Recalculating Setpoints

If you have locked out the "Recalculate Setpoints" capability from Run mode, you can recalculate setpoints on the Main Program Menu (see Figure 4-2, page 94).

You should always recalculate setpoints when you use the COPY TOOL function to create a new tool number. The copied tool will have the same percentages and the same setpoints as the original tool. If you create a new tool (not copying from an existing one), you do not have to recalculate setpoints. AutoSetPAC will automatically calculate setpoints when you run the press.

> ### CAUTION
>
> Do not recalculate setpoints immediately after a tonnage fault! Proceed only when you have completely corrected the problem that caused the fault. Failure to do so may result in damage to the press and tooling.
>
> **Failure to comply with these instructions could result in property damage.**

To recalculate setpoints, do the following:

1. Select the RECALCULATE SETPOINTS item on the Main Program Menu. The warning message shown in Figure 4-12 displays.
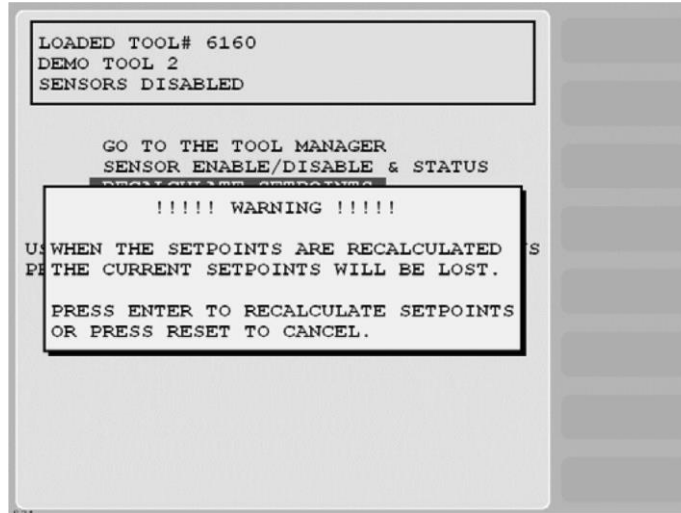
Figure 4-12. Main Program Menu with "RECALCULATE SETPOINTS" Warning Displayed

2. Press ENTER to confirm that you want to recalculate setpoints. The message SETPOINTS WILL BE RECALCULATED displays briefly on top of the warning message, and you are returned to the Main Program Menu. Setpoints are recalculated the next time you run the press and will appear on the appropriate Adjust Setpoints display (e.g., High Setpoint Limits, Low Setpoint Limits, etc.) the next time you access it.

Chapter 5   Using AutoSetPAC in Run Mode

This chapter shows you how to use the screens in Run mode to adjust Program tool settings, recalculate setpoints, display setpoints and current tonnage information, and load a tool. The chapter is organized in the following sections:

NOTICE

 "SmartPAC" refers to original SmartPAC, SmartPAC 2, and SmartPAC PRO, unless otherwise indicated.

NOTICE

REFER TO SMARTPAC USER MANUAL

If you need help using Run mode, refer to Chapter 6 in your SmartPAC user manual.

NOTICE

USING SMARTPAC HELP

If you need help with a Run mode screen, press the HELP or $\boxed{?}$ key when that screen is displayed.

Accessing the Tonnage Monitor Run Menu

The Tonnage Monitor Run Menu enables you to view tonnage readings and, if setting adjustments are not locked out of Run mode, to adjust tonnage settings. To access this menu, do the following:

NOTICE

A tool number must be loaded before switching to Run mode. If you attempt to switch to Run mode without a tool number loaded, the following message will display:

NO TOOL NUMBER HAS BEEN LOADED

To clear the message, turn the Program/Run key to "PROG," press RESET, and load a tool.

NOTICE

When switching between operating modes with the Program/Run key, make sure that SmartPAC is displaying the top-level screen in the current mode (i.e., Main Program Menu or Main Run Menu). To return to the top-level menu, press RESET or EXIT repeatedly.

---

1. From the main menu of the current operating mode, turn the Program/Run key to the "RUN" position. A screen like the one shown in Figure 5-1 will display:
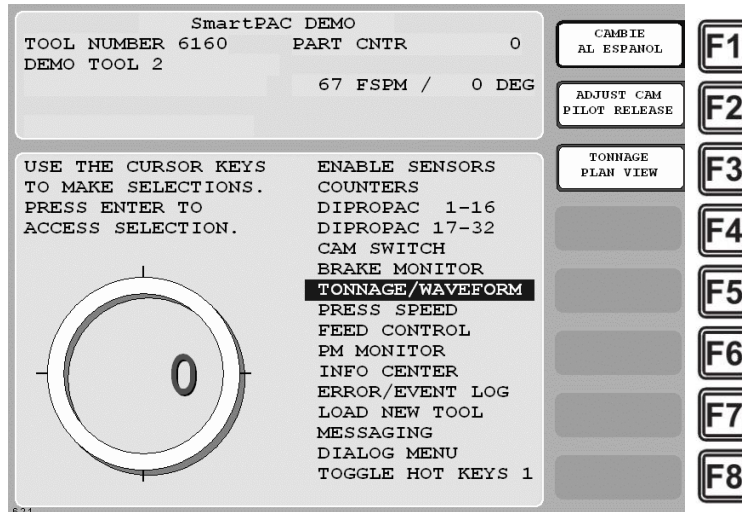

Figure 5-1. SmartPAC Main Run Menu

2. The items displayed on the Main Run Menu depend on installed options and security access settings. For example, the LOAD NEW TOOL item does not appear on the Run menu if the LOAD TOOL # item on the Security Access Menu in Initialization mode has been set to "PROGRAM MODE ONLY."

NOTICE

SELECT = HIGHLIGHT + ENTER
When this manual instructs you to select an item, you should highlight the item, and press ENTER.

---

3. Select "TONNAGE/WAVEFORM." The Tonnage Monitor Run Menu (see Figure 5-2) displays.

   The items displayed on the Tonnage Monitor Run Menu depend on security access settings. The RECALCULATE SETPOINTS item does not appear if the LOAD MONITOR item on the Security Access Menu in Initialization mode has been set to "NO RECALC/ADJUST."
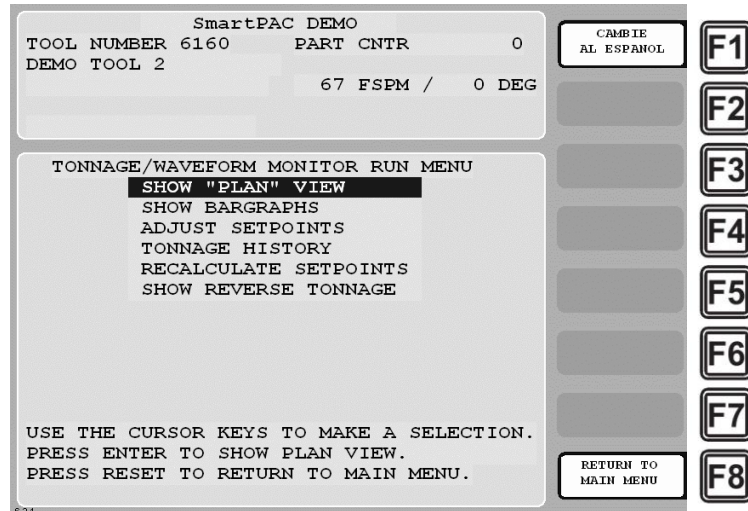

Figure 5-2. Tonnage Monitor Run Menu

Displaying Tonnage in Plan View

When you select SHOW "PLAN" VIEW on the Tonnage Monitor Run Menu, the screen shown in Figure 5-3 displays.
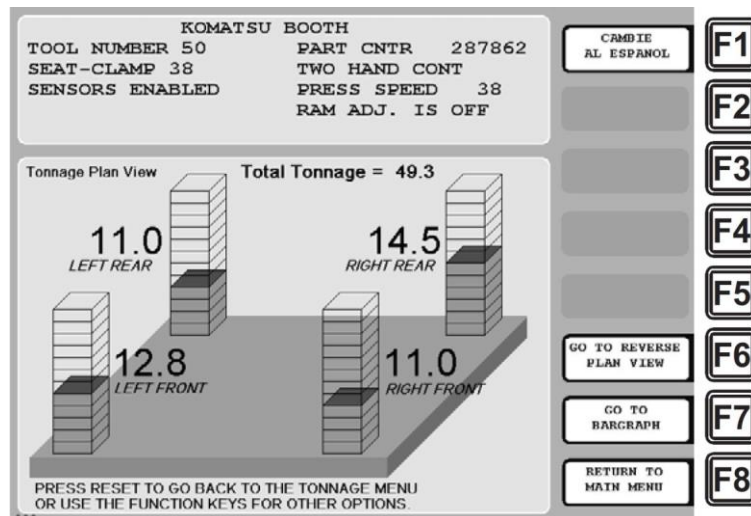
Figure 5-3. Tonnage "Plan" View Screen (4-channel AutoSetPAC Shown)

The Tonnage Plan View screen displays the current tonnage at each strain link as a colored column filling some fraction of a graduated rectangular container. The total height (or volume) of the container represents 120% of press capacity, so the height (or volume) of the colored column provides a good idea of the ratio of current tonnage to full-scale capacity.

The color of the column indicates the proximity of the tonnage reading to high and low setpoints, as follows:

- Green–Tonnage is safely below high setpoint and safely above low setpoint

- Yellow–Tonnage is within 25% of high or low setpoint

- Red–Tonnage exceeds high or low setpoint

Tonnage is also shown in numerical form next to each rectangular container. Tonnage readings are shown in tenths of a ton (e.g., 27.8 tons) if the full-scale capacity of the press is less than 100 tons per channel, as whole numbers (e.g., 28 tons) if full-scale capacity is 100 tons or greater.

To exit from the Tonnage Plan View screen, do one of the following:

- Press the F6 (Go to Reverse Plan View) function key to go to the Reverse Tonnage Plan View screen (see *Viewing Reverse Tonnage*)

- Press the F7 (Go to Bargraph) function key to go to the Tonnage Bargraph View screen (see next section)

- Press the F8 (Return to Main Menu) function key to return to the Main Run Menu

- Press RESET to return to the Tonnage Monitor Run Menu

Displaying Tonnage in Bargraph View

When you select SHOW BARGRAPHS on the Tonnage Monitor Run Menu, the screen shown in Figure 5-4 displays.
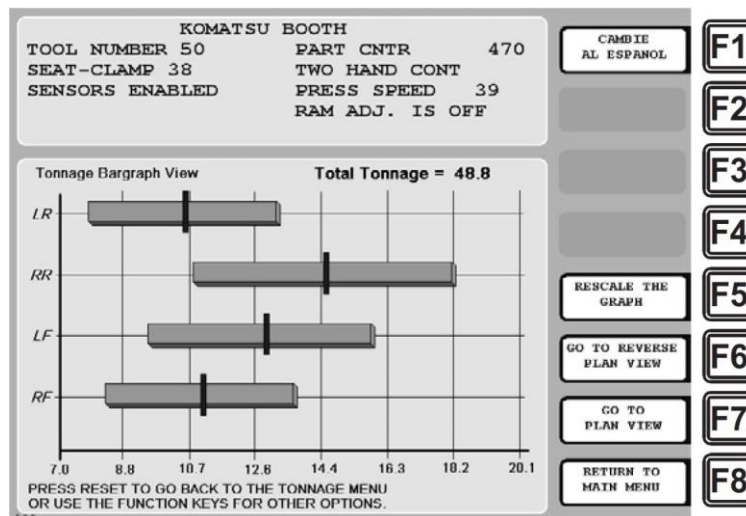

Figure 5-4. Tonnage Bargraph View Screen

The Tonnage Bargraph View screen displays the current tonnage at each strain link as a vertical magenta tick on a colored horizontal bar. The left end of the bar represents the low setpoint, the right end the high setpoint. Tonnage is shown dynamically, the vertical tick mark moving left or right on each bar as the tonnage recorded at each strain link changes from stroke to stroke.

The color of the bar indicates the proximity of the tonnage reading to high and low setpoints, as follows:

- Green–Tonnage is safely below high setpoint and safely above low setpoint

- Yellow–Tonnage is within 25% of high or low setpoint

- Red–Tonnage exceeds high or low setpoint

The scale of the bar graph (for instance, 7.0 through 20.1 in Figure 5-4) is determined by the tonnages recorded during the sample period and the setpoint calculations performed when the sample period has expired. If you are viewing the Tonnage Bargraph View screen while AutoSetPAC is calculating setpoints, the bars and graph scale may shrink as setpoints are calculated. You can rescale the graph and expand the bars by pressing the F5 (Rescale the Graph) function key.

To exit from the Tonnage Bargraph View screen, do one of the following:

- Press the F6 (Go to Reverse Plan View) function key to go to the Reverse Tonnage Plan View screen (see *Viewing Reverse Tonnage*, page 118)

- Press the F7 (Go to Plan View) function key to go to the Tonnage Plan View screen (see previous section)

- Press the F8 (Return to Main Menu) function key to return to the Main Run Menu

- Press RESET to return to the Tonnage Monitor Run Menu

Viewing and Adjusting Setpoints

When you select the ADJUST SETPOINTS item on the Tonnage Monitor Run Menu, the screen shown in Figure 5-5 displays.

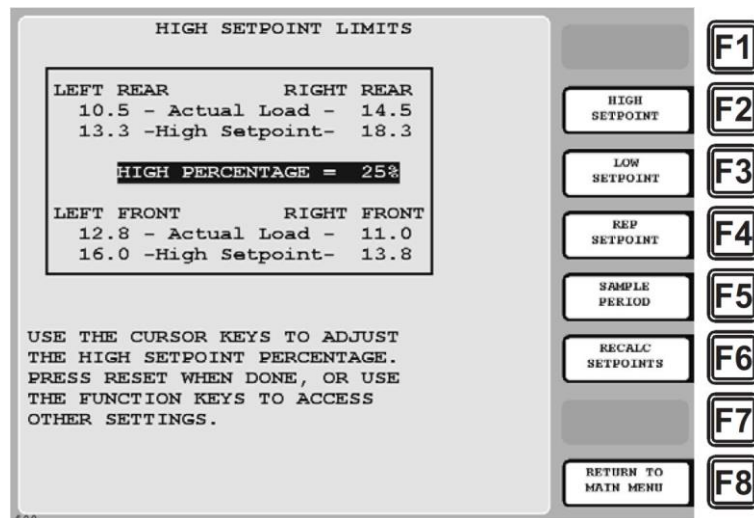*Figure 5-5.* Adjust Setpoints Screen: High Setpoint Limits Display

---

NOTICE

If the ADJUST SETPOINTS function has been locked out of Run mode (see *Locking Run Mode Actions*, page 67), the following message displays at the bottom of the Adjust Setpoints screen, and you will not be able to adjust setpoints:

> THE TONNAGE MONITOR ADJUST
> MODE IS LOCKED OUT. PRESS
> THE RESET KEY WHEN DONE.

The Adjust Setpoints screen allows you to make adjustments to the following Program tonnage settings and to recalculate setpoints based on these adjustments:

- High setpoint

- Low setpoint

- Repeatability setpoint

- Sample period

NOTICE

IMPORTANT
Adjustments you make on this screen change the Program settings for the currently loaded tool. Original settings are lost.

High Setpoint Limits

High setpoint values are displayed by default when you select the ADJUST SETPOINTS item (see Figure 5-5), or you can access them by pressing the F2 (High Setpoint) function key.

The High Setpoint Limits display shows the current high setpoint percentage, the most recently calculated high tonnage setpoints for each strain link using the displayed percentage, and the actual tonnage recorded for each strain link. Actual tonnages are updated on each stroke.

To adjust the high setpoint percentage up or down, press the Up Arrow (▲) or Down Arrow (▼) cursor key. Each keystroke increases or decreases the displayed value by 1 percent. As you adjust the high setpoint percentage, the high tonnage setpoint values for each strain link are updated, allowing you to see the results of your adjustments and to compare them with actual tonnage values.

To recalculate setpoints based on your change(s), refer to *Recalculating Setpoints*, page 112.

Low Setpoint Limits

To display low setpoint values (see Figure 5-6, page 111), press the F3 (Low Setpoint) function key.

The Low Setpoint Limits display shows the current low setpoint percentage, the most recently calculated low tonnage setpoints for each strain link using the displayed percentage, and the actual tonnage recorded for each strain link. Actual tonnages are updated on each stroke.

To adjust the low setpoint percentage up or down, press the Up Arrow (▲) or Down Arrow (▼) cursor key. Each keystroke increases or decreases the displayed value by 1 percent. As you adjust the low setpoint percentage, the low tonnage setpoint values for each strain link are updated, allowing you to see the results of your adjustments and to compare them with actual tonnage values.

To recalculate setpoints based on your change(s), refer to *Recalculating Setpoints*, page 112..
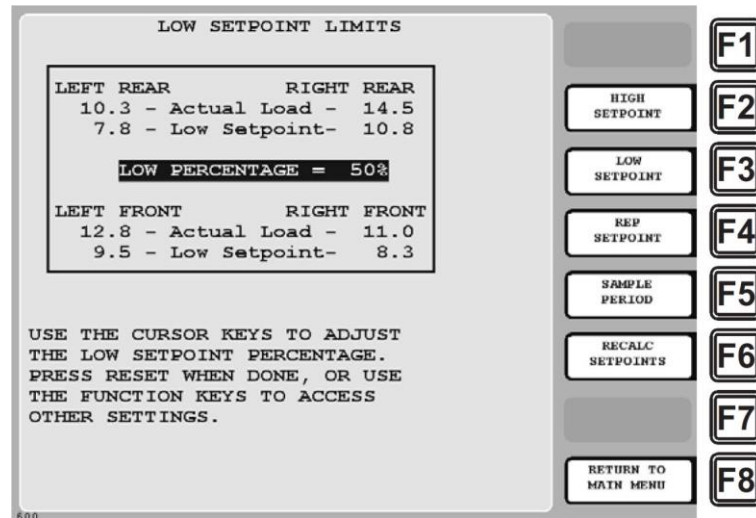

Figure 5-6. Adjust Setpoints Screen: Low Setpoint Limits Display

Repeatability Setpoint Limits

To display repeatability setpoint values (see Figure 5-7), press the F4 (Rep Setpoint) function key.
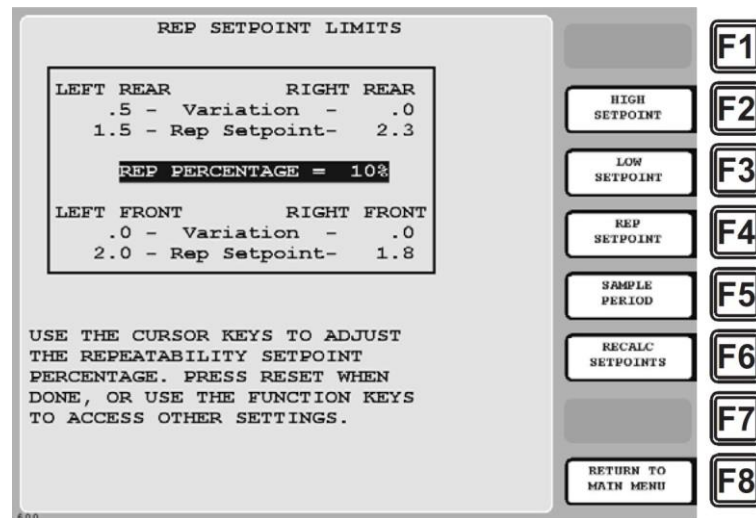
Figure 5-7. Adjust Setpoints Screen: Repeatability Setpoint Limits Display

The Repeatability Setpoint Limits display shows the current repeatability setpoint percentage, the most recently calculated repeatability setpoints for each strain link using the displayed percentage, and the actual stroke-to-stroke tonnage variation recorded for each strain link.

The tonnage variation reading is the highest stroke-to-stroke tonnage variance recorded during the last **n** number of strokes, where *n* is the length of the sample period. For example, if the sample period is set to 15 strokes, AutoSetPAC collects tonnage variance information for the most recent 15 strokes.

To adjust the repeatability setpoint percentage up or down, press the Up Arrow (▲) or Down Arrow (▼) cursor key. Each keystroke increases or decreases the displayed value by 1 percent. As you

adjust the repeatability setpoint percentage, the repeatability setpoint values for each strain link are updated, allowing you to see the results of your adjustments and to compare them with actual stroke-to-stroke tonnage values.

To recalculate setpoints based on your change(s), refer to *Recalculating Setpoints*, page 112..

Setpoint Calculation Period

To display the sample period setting (see Figure 5-8), press the F5 (Sample Period) function key.
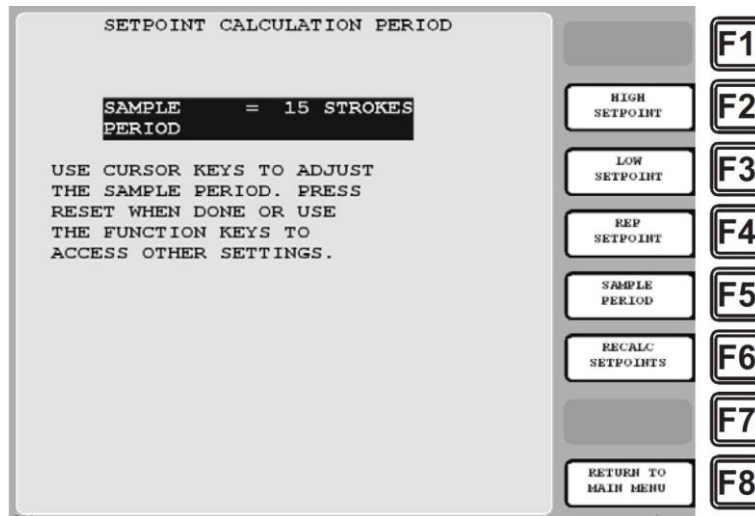
Figure 5-8. Adjust Setpoints Screen: Sample Period Display

To adjust the sample period value up or down, press the Up Arrow (▲) or Down Arrow (▼) cursor key. Each keystroke increases or decreases the displayed value by 1 stroke. The sample period value is adjustable from 1 to 100 strokes.

To recalculate setpoints based on your change(s), refer to *Recalculating Setpoints*, next.

Recalculating Setpoints

> **NOTICE**
>
> If the RECALCULATE SETPOINTS function has been locked out of Run mode (see *Locking Run Mode Actions*, page 67), the "RECALC SETPOINTS" caption does not display next to the F6 function key on the Adjust Setpoints screen.

To initiate the setpoint calculation process, press F6 (Recalc Setpoints). The following warning (see Figure 5-9) displays.

Figure 5-9. Adjust Setpoints Screen: Recalculate Setpoints Warning Message

Press ENTER to confirm that you want to recalculate setpoints. The message

    SETPOINTS WILL BE RECALCULATED

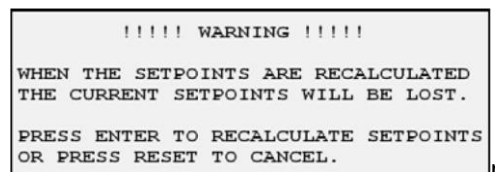displays briefly on top of the warning message, and you are returned to the Adjust Setpoints screen. Setpoints are recalculated the next time you run the press and will appear on the appropriate Adjust Setpoints display (e.g., High Setpoint Limits, Low Setpoint Limits, etc.) the next time you access it.

Viewing Tonnage History

When you select "TONNAGE HISTORY" on the Tonnage Monitor Run Menu, the following screen (see Figure 5-10) displays.
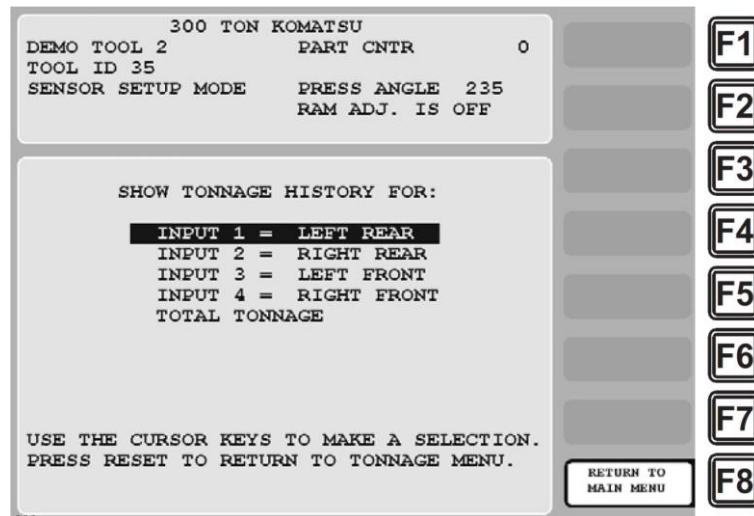
Figure 5-10. Tonnage History Menu

The Tonnage History Menu gives you access to screens that provide tonnage history for each strain link input (first four menu items) and for the strain link total (last menu item).

Viewing Tonnage History for a Selected Strain Link Input

To view tonnage history for a selected strain link input, select that input on the Tonnage History Menu. A screen like the one shown in Figure 5-11 displays.

The tonnage history display for each strain link input provides statistical information (see Table 5-1, below, for an explanation of each field) about your process that can help you to improve part quality, achieve more efficient runs, identify tool wear, etc. Displayed values are updated on every hit.

NOTICE

Tonnage history ignores tonnage information that occurs during the startup counter period or when AutoSetPAC is in Setup mode.

Figure 5-11. Tonnage History Display for "Left Rear" Input (#1)

Table 5-1. Tonnage History Information for Each Strain Link Input

Field	Description
# OF HITS	The period of time, measured in number of strokes, during which AutoSetPAC has collected the displayed historical data.
HIGHEST LOAD	The highest tonnage recorded during the data collection period. This value is useful in cases of catastrophic damage, or when you need to determine whether tooling components failed due to an overload or other reason.
AVERAGE LOAD	The mean tonnage recorded during the data collection period. This value can be compared to the actual tonnage (see next item) to help estimate tool wear.
ACTUAL LOAD	The current operating tonnage for the selected strain link input.
HIGH OVERLOAD S	The number of high setpoint faults recorded during the data collection period. This value in conjunction with the LOW FAULT and REP FAULT items (see below) helps to determine the "problem" dies.
LOW FAULTS	The number of low setpoint faults recorded during the data collection period. This value in conjunction with the HIGH OVERLOAD (see above) and REP FAULT (see below) items helps to determine the "problem" dies.
REP FAULTS	The number of repeatability setpoint faults recorded during the data collection period. This value in conjunction with the HIGH OVERLOAD and LOW FAULT items (see above) helps to determine the "problem" dies.

Highest, average, and actual load values and the high overload count begin accumulating when tonnage history is cleared (see *Clearing Tonnage History*, page 117) and are incremented until the next time tonnage history is cleared. Low and repeatability fault values begin accumulating when the tool is loaded and are reset to zero when the tool is reloaded.

Viewing History for the Total Strain Link Tonnage

To view history for the total tonnage on all strain link inputs, select the TOTAL TONNAGE item on the Tonnage History Menu. A screen like the one shown in Figure 5-12 displays.
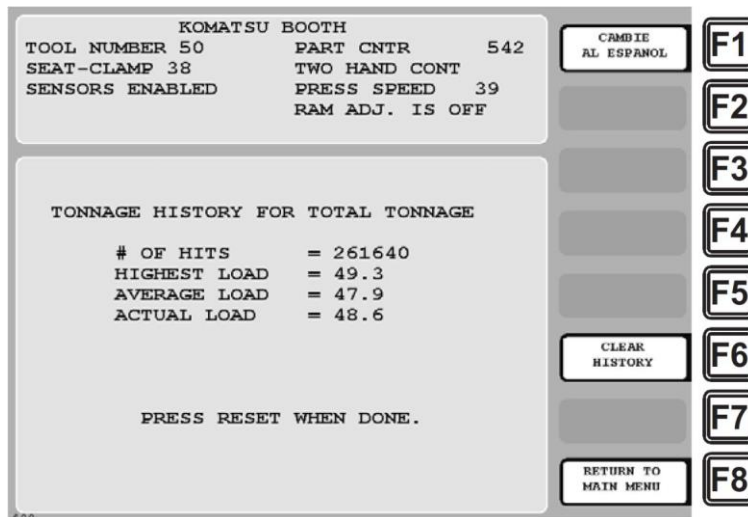
Figure 5-12. Tonnage History for "Total Tonnage" Display

Tonnage information provided on this screen is explained in Table 5-2.

Table 5-2. Tonnage History Information for Total Tonnage

Field	Description
# OF HITS	The period of time, measured in number of strokes, during which AutoSetPAC has collected the displayed historical data.
HIGHEST LOAD	The highest tonnage recorded during the data collection period. This value is useful in cases of catastrophic damage, or when you need to determine whether tooling components failed due to overload or other reasons.
AVERAGE LOAD	The average tonnage recorded during the data collection period. This value can be compared to the actual tonnage to help estimate tool wear.
ACTUAL LOAD	The current operating tonnage for all strain link inputs.

Clearing Tonnage History

To delete all the information in tonnage history, press the F6 (Clear History) function key on the Tonnage History for Total Tonnage display. The following warning message (see Figure 5-13) displays, asking you to confirm that you want to clear tonnage history.

```
        !!!!! WARNING !!!!!

THIS WILL CLEAR THE TONNAGE HISTORY
FOR ALL INPUTS PLUS THE TOTAL. IF
YOU WANT TO DO THIS THEN PRESS THE
CLEAR KEY. IF YOU DO NOT THEN PRESS
THE RESET KEY.
```

Figure 5-13. "Clear Tonnage History" Warning Message

NOTICE

USE CAUTION WHEN CLEARING TONNAGE HISTORY
Do not press the CLEAR key unless you are sure that you want to clear tonnage history. When you press CLEAR, all tonnage history data is deleted and cannot be retrieved.

To confirm that you want to clear tonnage history, press the CLEAR key. (To cancel this action, press RESET.)

Press RESET to return to the Tonnage Monitor Run Menu.

Recalculating Setpoints

NOTICE

If the RECALCULATE SETPOINTS function has been locked out of Run mode (see *Locking Run Mode Actions*, page 67), that item does not appear on the Tonnage Monitor Run Menu.

When you select RECALCULATE SETPOINTS on the Tonnage Monitor Run Menu, the warning message shown in Figure 5-14 displays:

```
        !!!!! WARNING !!!!!

WHEN THE SETPOINTS ARE RECALCULATED
THE CURRENT SETPOINTS WILL BE LOST.

PRESS ENTER TO RECALCULATE SETPOINTS
OR PRESS RESET TO CANCEL.
```

Figure 5-14. Tonnage Monitor Run Menu: Recalculate Setpoints Warning Message

Press ENTER to confirm that you want to recalculate setpoints. The message

        SETPOINTS WILL BE RECALCULATED

displays briefly on top of the warning message, and you are returned to the Tonnage Monitor Run Menu. Setpoints are recalculated the next time you run the press and will appear on the appropriate Adjust Setpoints display (e.g., High Setpoint Limits, Low Setpoint Limits, etc.) the next time you access it.

You should always recalculate setpoints when you have used the COPY TOOL function to create a new tool number. The copied tool will have the same percentages and the same setpoints as the original tool. If you create a new tool (not copying from an existing one), you do not have to recalculate setpoints. AutoSetPAC will automatically calculate setpoints when you run the press.

CAUTION

Do not recalculate setpoints when the press is stopped due to a tonnage fault. Proceed only when you have completely corrected the problem! Failure to do so may result in damage to the press and tooling.

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

Viewing Reverse Tonnage

When you select "SHOW REVERSE TONNAGE" on the Tonnage Monitor Run Menu, the screen shown in Figure 5-15 displays.
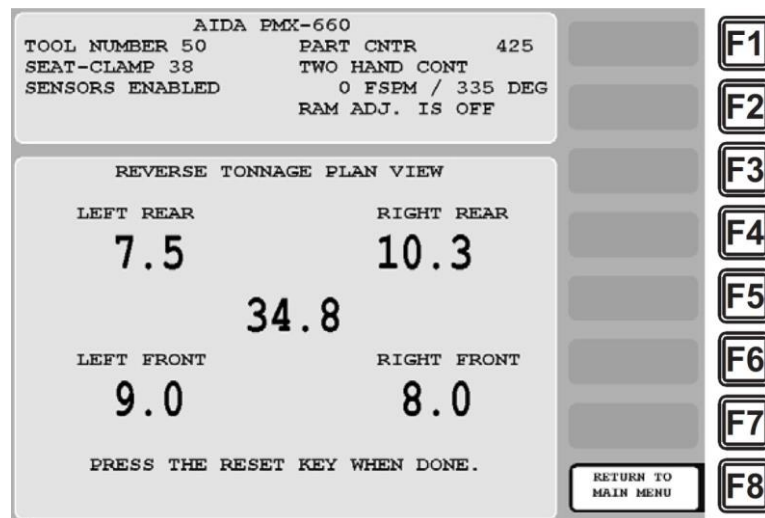
Figure 5-15. Reverse Tonnage Plan View Screen

The Reverse Tonnage Plan View screen displays the reverse "snap-through" tonnage for each strain link input and the total reverse tonnage for all strain link inputs. The reverse tonnage setpoint, which is set in Initialization mode (see *Setting Reverse Setpoint % of Press Capacity*, page 66), is not shown on this screen, and cannot be adjusted.

When you are done viewing this screen, press RESET to return to the Tonnage Monitor Run Menu.

Loading a New Tool

> **NOTICE**
>
> In order to load a new tool in Run mode, the LOAD TOOL # item on the Security Access Menu in Initialization mode must be set to "PROGRAM AND RUN MODES." If this item has been set to "PROGRAM MODE ONLY," the LOAD NEW TOOL item will not appear on the Main Run Menu.

If the LOAD NEW TOOL function is not locked out of Run mode, you can load any tool that has been set up in Program mode from the Main Run Menu. However, a tool number cannot be loaded while the press is running. To load a new tool, perform the following steps.

> **NOTICE**
>
> If you attempt to load a tool while the press is running, a message will display, indicating that the press must be stopped before a tool number can be loaded.

1. Select LOAD NEW TOOL on the Main Run Menu. The Tool Manager screen displays.
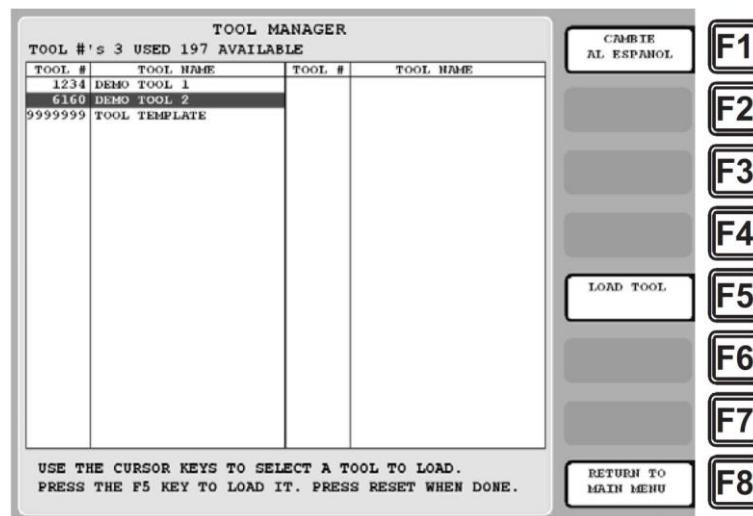
Figure 5-16. Tool Manager Screen

2. Highlight the tool you want, and press F5 (Load Tool). A warning message displays.
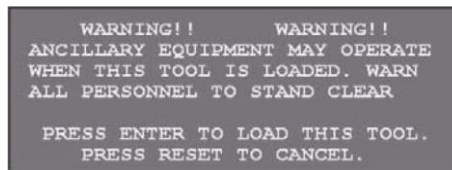

Figure 5-17. Load Tool Warning Message

3. Press ENTER to load the tool. (Press RESET if you want to cancel.) The message shown in **Error! Reference source not found.** displays briefly; then you are returned to the Main Run Menu.

```
TOOL NUMBER 6160
                .......IS BEING LOADED
```

Figure 5-18. Tool Loading Message

Chapter 6   Troubleshooting

This chapter shows you how to respond to AutoSetPAC faults and perform troubleshooting on a few common AutoSetPAC problems. It is organized in the following sections:

NOTICE

"SmartPAC" refers to original SmartPAC, SmartPAC 2, and SmartPAC PRO, unless otherwise indicated.

Responding to AutoSetPAC Faults

When a setpoint is exceeded or there is an offset error on one or more strain links, AutoSetPAC opens the output relay and stops the press, simultaneously displaying a fault message on top of the SmartPAC Main Run Menu (see Figure 6-1, in which a high setpoint fault message is used as an example).
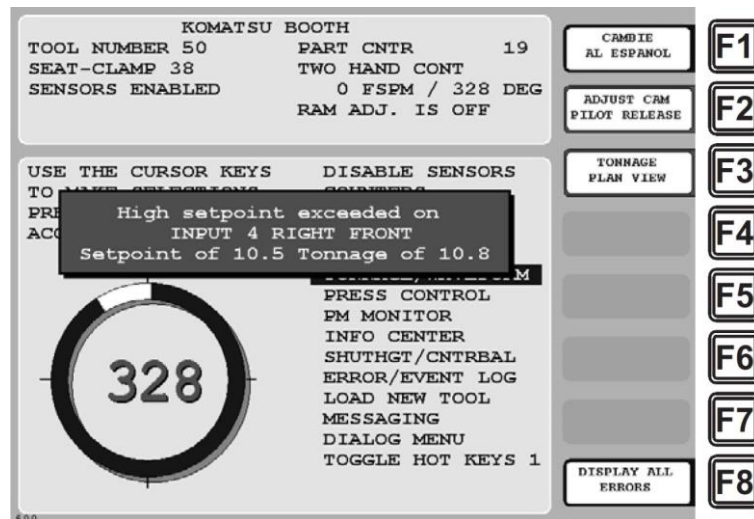

Figure 6-1. AutoSetPAC Tonnage Fault Message: High Setpoint Exceeded

The fault message provides the following information:

- Type of setpoint fault (i.e., high, low, etc.)
- Strain link input (both input number and name are shown) on which the fault occurred
- Setpoint value that was exceeded
- Tonnage value that generated the fault

Only one faulted channel is identified in an AutoSetPAC message, but setpoints for other strain link inputs may have been exceeded as well and other types of faults may have occurred. You can check to see if other channels are at fault by accessing the Adjust Setpoints screen (see *Viewing and Adjusting Setpoints*, page 109) and comparing the setpoint and tonnage value for each strain link.

For high and low tonnage faults, you can also refer to the Tonnage Bargraph View screen (see *Displaying Tonnage in Bargraph View*, page 108), which shows each channel with a high or low tonnage fault in red and provides a graphical representation of how much the tonnage diverges from the high or low setpoint.

The Tonnage Plan View screen (see *Displaying Tonnage in Plan View*, page 107) shows each channel with a high tonnage fault in red.

Before you reset AutoSetPAC, make sure that you have completely corrected the problem. Determine whether the fault was simply a nuisance stop or was caused by an actual press or die malfunction. A nuisance stop occurs when setpoints are so tight that small, normal variations in tonnage cause AutoSetPAC to shut down the press.

If the fault was caused by a nuisance stop, you need to adjust the offending setpoint so that it is higher (or, in the case of a low setpoint, lower) than normal tonnage fluctuations. You may also need to lengthen the sample period to provide AutoSetPAC with a broader range of values from which to select a reference tonnage for calculating setpoints.

CAUTION

If the press stopped due to a real fault, do not continue until you have completely corrected the problem. Failure to do so may result in damage to the press and tooling.

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

If the fault was caused by a press or die malfunction, you need to find and correct the problem immediately. Do not clear the fault until you have corrected the problem. Common causes of tonnage faults are shown in Table 6-1:

Table 6-1. Common Causes of Tonnage Faults

Stuck part
Variation in shut height
Significant change in material thickness or hardness
Slug stacking
Load imbalance
Misfeed
Broken punch
End of stock

NOTICE

IMPORTANT INFORMATION TO PROVIDE WHEN CONTACTING WINTRISS TECH. SUPPORT

When you contact Wintriss Tech. Support for technical assistance, be ready to provide the following information to expedite a resolution to the problem: product name (e.g. SmartPAC 2 standard); installed options (e.g. AutoSetPAC, etc.); and firmware version number (e.g. Vs. 2.00). You can determine the last two items by accessing the List of Installed Options screen in Initialization mode (see Chapter 4 of your SmartPAC manual for details).

Once you have determined the reason for the fault message and corrected the problem, you can clear the fault message by pressing the RESET or EXIT key on the SmartPAC front panel. The message will disappear, and the press can be restarted.

NOTICE

The RESET key on the optional AutoSetPAC display (if you have one) is not functional.

NOTICE

Wintriss recommends that you connect AutoSetPAC to the top-stop rather than to the E-stop circuit of your press to prevent the press from sticking on the bottom if an overload occurs.

Remember that top stop circuits are active only in Continuous (automatic) operations on most press controls. If overload protection is required during Inch or Single-stroke mode, you may have to install an additional relay so that AutoSetPAC will stop the press. Refer to Chapter 2 for more information.

Setpoint Faults

This section shows you how to respond to the following setpoint faults:

- Repeatability
- High tonnage
- Low tonnage
- Reverse tonnage
- 120% of press capacity overload

Each of these setpoint fault types has a different constellation of likely causes, but the process by which you respond to the fault is identical. When a message for one of the four setpoint faults displays, do the following:

1. Check to see whether additional channels are affected and whether there are other types of faults, referring to the Adjust Setpoints, Tonnage Bargraph View, and Tonnage Plan View screens.

2. Determine whether the fault has been caused by a nuisance stop or a press or die malfunction.

3. If the cause is a nuisance stop, loosen the setpoints on the offending strain link or lengthen the sample period.

   or

   If the cause is a press or die malfunction, check the possibilities shown in Table 6-2.

---

4. When the problem has been corrected, press RESET and restart the press.

Table 6-2. Setpoint Faults: Possible Causes

Setpoint Fault Type	Possible Cause(s)
Repeatability	**Change in the die due to:** Slug stacking Misfeed End of stock Broken punch Change in material thickness or hardness

High	Material feed problems
	Double parts in the die
	Tool wear
	Loss of lubrication
	   For presses with column-mounted strain links, high tonnage readings could indicate galled leader pins or bushings.
	   If the press is running without tooling, high tonnage readings may indicate improper lubrication or loss of lubrication in the gibbs or bearings.

Low	End of stock Broken punch
Reverse	Refer to Table 6-1.
120% of Press Capacity	Refer to Table 6-1. Also check the following: Foreign objects (e.g., wrench) in the die Electrical noise in the strain link cables, which can cause false signals If only one input is overloaded, try moving the tooling/die away from that input to distribute the load more evenly.

Offset Errors

AutoSetPAC displays an offset error when one or more strain links transmit a signal that is either too high or too low for the load analyzer to interpret accurately. Offset errors occur when a strain link loosens, is damaged, or otherwise fails.

To correct the problem:

- Check wiring of the strain link(s) on the affected channel(s). Rewire if necessary.

- Check mounting of the strain link. If the strain link has loosened, remount the strain link.

- If neither of these solutions fixes the problem, the strain link may be damaged and should be replaced.

If you remount or replace a strain link, you must rezero the strain link (refer to *Zeroing Strain Links*, page 71). When replacing a strain link, you do not have to recalibrate AutoSetPAC unless you move the strain link to a different location.

Troubleshooting Common AutoSetPAC Problems

The following sections show you how to troubleshoot problems you may encounter as you run the press with AutoSetPAC.

Tonnage/WaveForm Menu Option Does Not Display at Power-up (Communications Error)

1. Verify that the AutoSetPAC processor board has power by testing both sides of fuse F102 (see Figure 2-6, page 35, or Figure 2-7, page 36). If power is not present, check AC wiring, referring to *Connecting AC and Stop Circuit Wiring*, page 33.

2. Verify that the SmartPAC and AutoSetPAC boards are communicating by checking the Tx (DS106) and Rx (DS107) LEDs on the AutoSetPAC processor board (see Figure 2-6, page 35, or Figure 2-7, page 36). If the LEDs are blinking alternately, the two boards are communicating.

3. If the LEDs are unlit, the boards are not communicating. Check communications wiring, referring to *Connecting Communications Wiring to SmartPAC 2 or SmartPAC PRO,* page 48.

    a. Verify that the resolver is wired correctly to the SmartPAC processor board (refer to Chapter 2 in the SmartPAC manual) and that strain links are mounted properly and wired correctly to the AutoSetPAC board (refer to *Installing Strain Links*, page 39). To do so, perform the following procedures:

    a. Turn off power to SmartPAC and AutoSetPAC.

    b. Remove the resolver connector (TB101) from the SmartPAC board and all strain link connectors (TB105 and TB106 on 2-channel AutoSetPACs, TB105, TB106, TB107, and TB108 on 4-channel units) from the AutoSetPAC board.

    c. Power the SmartPAC and AutoSetPAC back up, and see if communications is resumed (i.e., the TONNAGE/WAVEFORM menu item displays).

    d. If SmartPAC and AutoSetPAC are now communicating properly, perform the following steps in sequence to isolate the specific wiring connection at fault:

        •   Plug the resolver connector back into its socket on the SmartPAC board, and power up the units again. If communications are good, go to the next step. Otherwise, check the resolver wiring, referring to Chapter 2 in your SmartPAC manual. If wiring is good, go to the next step. If there is a wiring problem, correct it and go to the next step.

        •   Plug the strain link connectors back into their sockets on the AutoSetPAC board, one at a time, starting with the "Left" connector for a 2-input AutoSetPAC or "Left Front" connector for a 4-input system. Power the units back up. If communications are good, go to the next step. Otherwise, check the wiring for that strain link, referring to *Wiring Strain Links*, page 44. If wiring is good, go to the next step. If there is a wiring problem, correct it and go to the next step.

        •   Plug the "Right" (2-input AutoSetPAC) or "Right Front" (4-input unit) connector back into its socket on the AutoSetPAC processor board. Power the units back up. If communications are good, go to the next step. Otherwise, check the wiring for that strain link. If wiring is good, go to the next step. If there is a wiring problem, correct it and go to the next step.

- If you have a 4-channel AutoSetPAC, repeat this process for the remaining two strain link connectors.

e. If you are still having difficulty, contact Wintriss Tech. Support.

Displayed Tonnage Is Lower Than It Should Be

If the tonnage displayed for one or more strain links is lower than you think it should be, do the following:

If your system is new or has just been calibrated:

1. Verify that the zero cam signal is closed to ground during the top of the stroke and open at the bottom of the stroke, referring to the Zero Cam LED (DS104) on the AutoSetPAC processor board (see Figure 2-6, page 35, or Figure 2-7, page 36). The zero cam signal is closed to ground when the LED is lit, open when the LED is unlit.

2. Check to make sure that the mounting and wiring of the corresponding strain link(s) were performed correctly. Make sure that the strain links are mounted on a clean, flat surface. See *Installing Strain Links*, page 39.

3. Check to make sure that the calibration was done properly. Check to see if the calfactors are correct. Make sure that the calfactors you set are the same as the ones you wrote down during the calibration. Refer to Chapter 3.

If you have an existing installation:

4. Check for a stretched or broken tie rod on straight-side presses.

Tonnage Display(s) Shows No Tonnage

1. Check to make sure that the zero cam signal from SmartPAC to AutoSetPAC has been wired correctly (see *Connecting the Zero Cam Signal to SmartPAC 2 or SmartPAC PRO*, page 46).

2. Verify that the zero cam signal is closed to ground during the top of the stroke and open at the bottom of the stroke, referring to the Zero Cam LED (DS104) on the AutoSetPAC processor board (see Figure 2-6, page 35, or Figure 2-7, page 36). The zero cam signal is closed to ground when the LED is lit, open when the LED is unlit.

Front Tonnage Displays Show No Tonnage (4-Channel Units)

1. Check the setting of switch #7 on S101 (see page 59). If the switch is set to ON, which enables 2-channel operation in a 4-channel AutoSet, change the setting back to OFF, the default.

2. If setting switch #7 to OFF does not solve the problem, or if the switch is already in the OFF position, contact Wintriss Tech. Support.

Glossary

high setpoint
: The tonnage limit above which AutoSetPAC generates a high tonnage fault, stopping the press and displaying a fault message. To calculate the high setpoint, AutoSetPAC multiplies the high setpoint percentage specified in Program mode by the *reference tonnage* and adds this value to the reference tonnage.

linearity
: The proportional increase of tonnage readings with increasing load, a measure of how well the press has been calibrated. When a press has been calibrated for linearity, AutoSetPAC should read 40 tons when 40 tons is applied to the load cells and 80 tons when 80 tons is applied.

low setpoint
: The tonnage limit below which AutoSetPAC generates a low tonnage fault, stopping the press and displaying a fault message. To calculate the low setpoint, AutoSetPAC multiplies the low setpoint percentage specified in Program mode by the *reference tonnage* and subtracts this value from the reference tonnage.

nuisance stop
: A press shutdown initiated by AutoSetPAC because setpoints have been set too close to normal tonnage values or normal tonnage variations. As a result, setpoints are regularly exceeded, causing unnecessary press shutdowns.

reference tonnage
: The highest tonnage measured by AutoSetPAC during the sample period.

repeatability setpoint
: The limit in tonnage variation from one stroke to the next above which AutoSetPAC generates a repeatability fault, stopping the press and displaying a fault message. To calculate the repeatability setpoint, AutoSetPAC multiplies the repeatability setpoint percentage specified in Program mode by the *reference tonnage*.

reverse setpoint
: The reverse tonnage limit above which AutoSetPAC generates a reverse tonnage fault, stopping the press and displaying a fault message. To calculate the reverse tonnage setpoint, AutoSetPAC multiplies the reverse setpoint percentage specified in Initialization mode by the Initialization setting for the full-scale capacity of the press.

sample period
: The number of strokes during which AutoSetPAC collects and measures press tonnage in order to calculate high, low, and repeatability setpoints. AutoSetPAC calculates setpoints using the highest tonnage measured during the sample period as the reference tonnage.

setup mode	A press operating mode that enables the press to be run in Inch without generating low setpoint or repeatability faults. With this setting enabled, AutoSetPAC disables low and repeatability setpoints whenever the press is operated in Inch.
startup counter	The number of strokes to allow after startup of the press before AutoSetPAC begins to monitor tonnage or calculate setpoints. During the period defined by the specified number of strokes, AutoSetPAC disables high, low, and repeatability setpoints and suspends calculation of setpoints. AutoSetPAC provides 120%- of-press-capacity protection during this startup period.
	The startup counter is used primarily to allow high-speed presses to come up to speed before AutoSetPAC begins to monitor tonnage. It is also used to allow press tonnage to stabilize before calculating setpoints.
tonnage fault	A press shutdown initiated by AutoSetPAC because tonnage has fluctuated enough to exceed the high, low, repeatability, or reverse setpoint. A fault may be caused by a stuck part, significant change in material thickness or hardness, slug stacking, load imbalance, misfeed, broken punch, end of stock, or any die malfunctions.
zero cam	A closure-to-ground signal that turns on at approximately 240° and turns off at 30°. The zero cam signal "zeroes," or clears, the tonnage reading on each stroke and prevents AutoSetPAC from registering tonnage events within the zero cam window. Zero cam ensures that AutoSetPAC records only tonnage that occurs at the bottom of the stroke.

Index

Wintriss Controls Group

TITLE: 120 VAC AutoSetPAC 2 Channel with SmartPAC 2 Wiring Diagram

DRAWING NUMBER: FIGURE 1

DRAWN: ADB   DATE: 8/30/18

SIZE: C

SHEET   OF

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Figure 2. 120 VAC AutoSetPAC 4 Channel with SmartPAC 2 Wiring Diagram — Wintriss Controls Group

WINTRISS CONTROLS GROUP

SMARTPAC 2 LOOPBACK WIRING CONNECTIONS

FIGURE 3

REVISIONS

REV	DESCRIPTION	DATE	APP'D

WINTRISS CONTROLS GROUP

TITLE
120 VAC AutoSetPAC 2 Channel
with SmartPAC 1 Wiring Diagram

| DRAWN | ADB | DATE 8/30/18 |
| CHK. | | |

APPROVALS
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CODE IDENT NO.	SIZE C	DRAWING NUMBER	REV
FILENAME		FIGURE 4	
REL	SCALE	SHEET	OF

TS1   TO TOP STOP CIRCUIT
TS2   OF CLUTCH/BRAKE CONTROL

NOTE: IF USING A WINTRISS CLUTCH/BRAKE CONTROL REMOVE THE JUMPER WIRE BETWEEN VPC TERMINAL #79 TO #80 AND THEN CONNECT TS1 TO TERMINAL #79 AND TS2 TO TERMINAL #80.

SHIELD Differential StraimLink
GRN WHT BLK RED

SHIELD Differential StraimLink
GRN WHT BLK RED

CONNECT TO ENC
CONNECT TO ENC

TB103
6 <STOP>
5 <STOP>
4 <CHAS>
3 <GND>
2 <L2>
1 <L1>

TB105 INPUT 1 LEFT
1 <SHIELD>
2 <-INPUT>
3 <+INPUT>
4 <+EX>
5 <+EX>

TB106 INPUT 2 RIGHT
1 <SHIELD>
2 <-INPUT>
3 <+INPUT>
4 <+EX>
5 <+EX>

AUTOSETPAC 2 INPUT   TB101B
1 <REM RESET>
2 <ZERO CAM>
3 <AUX>
4 <+12 VDC>
5 <GND>
6 <IN1 REC>
7 <IN2 REC>
8 <SETUP/DISABLE>

TB104 COMM.
1 <SHLD>
2 <+TX>
3 <-TX>
4 <+RXD>
5 <-RXD>

GRN RED BRN ORG BLK

CONNECT SHIELD TO THE ENCLOSURE AT THE CONDUIT ENTRY POINT

Cut off and do not use the Yellow wire.

Use Wintriss cable:
30 feet - #4328501
100 feet - #4328502

ES1 TO ESTOP CIRCUIT
ES2 OF CLUTCH/BRAKE CONTROL

MAIN POWER CONNECTOR TB101
211 <Zero>
210 <TSTOP>
209 <TSTOP>
208 <ESTOP>
207 <ESTOP>
206 <B>
205 <A>
204 <Chas>
203 <Grd>
202 <L2>
201 <L1>

VPC PORT TB104
222 <P-G>
221 <-TX1>
220 <+TX1>
220 <-RX1>
219 <+RX1>

RESOLVER PORT TB106
218 <S4>
217 <S3>
216 <R2>
215 <S2>
214 <R1>
213 <S1>
212 <SH4>

POSITION SENSOR TB107
247 <P-G>
246 <Pos>
245 <+V>

MODULE PORT TB102
244 <+TXD2>
243 <+TXD2>
242 <-RXD2>
241 <+RXD2>
240 <P-G>
239 <-TXD1>
238 <+TXD1>
237 <+TXD1>
236 <-RXD1>
235 <+RXD1>

GRN RED BRN ORG BLK

SFI PORT

CPR PORT TB103
234 <-TXD2>
233 <+TXD4>
232 <TXD2>
231 <-RXD4>
230 <+RXD4>
229 <P-G>
228 <-TXD3>
227 <+TXD3>
226 <TXD3>
225 <-RXD3>
224 <+RXD3>

SPARE PORT

Wintriss SmartPAC

TB201
252 <GRD>
251 <CONT>
250 <S.S.>
249 <INCH/SETUP>
248 <OFF>

TB202
256 <GRD>
255 <CLOCKOUT>
254 <OP STA 2>
253 <OP STA 1>

TB203
258 <GRD>
257 <REMOTE RES.>

CONNECT SHIELD TO THE ENCLOSURE AT THE CONDUIT ENTRY POINT

Figure 5 — 120 VAC AutoSetPAC 4 Channel with SmartPAC 1 Wiring Diagram

WINTRISS CONTROLS GROUP

TITLE: 24 VDC AutosetPAC 4 Channel with SmartPAC 2 wiring diagram

DRAWING NUMBER: FIGURE 6

DRAWN: ADB DATE: 2/24/18

SIZE: C

Option Switch SW101 functions:

Switch 1 - On sets address for second AutosetPAC
Switch 2 - On puts AutosetPAC into 2 channel mode
Switch 3 - On forces new firmware download always
Switch 4 - On enables 100 Hz reverse load filtering

Use Wintriss cable:
30 feet - #4388501
100 feet - #4388502

Cut off and do not use the Yellow wire.

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WINTRISS CONTROLS GROUP

24 VDC AutosetPAC 2 Channel
with SmartPAC 2 wiring diagram

FIGURE 7

REVISIONS

REV	DESCRIPTION	DATE	APP'D

ES1   TO ESTOP CIRCUIT
ES2   OF CLUTCH/BRAKE CONTROL

TS1   TO TOP STOP CIRCUIT
TS2   OF CLUTCH/BRAKE CONTROL

NOTE: IF USING A VINTRISS CLUTCH/BRAKE CONTROL REMOVE THE JUMPER WIRE BETWEEN VPC TERMINAL #79 TO #80 AND THEN CONNECT TS1 TO TERMINAL #79 AND TS2 TO TERMINAL #80.

SHIELD   Differential   Strainlink
GRN
WHT
BLK
RED
CONNECT TO ENC

SHIELD   Differential   Strainlink
GRN
WHT
BLK
RED
CONNECT TO ENC

TB103
6 (STOP)
5 (STOP)
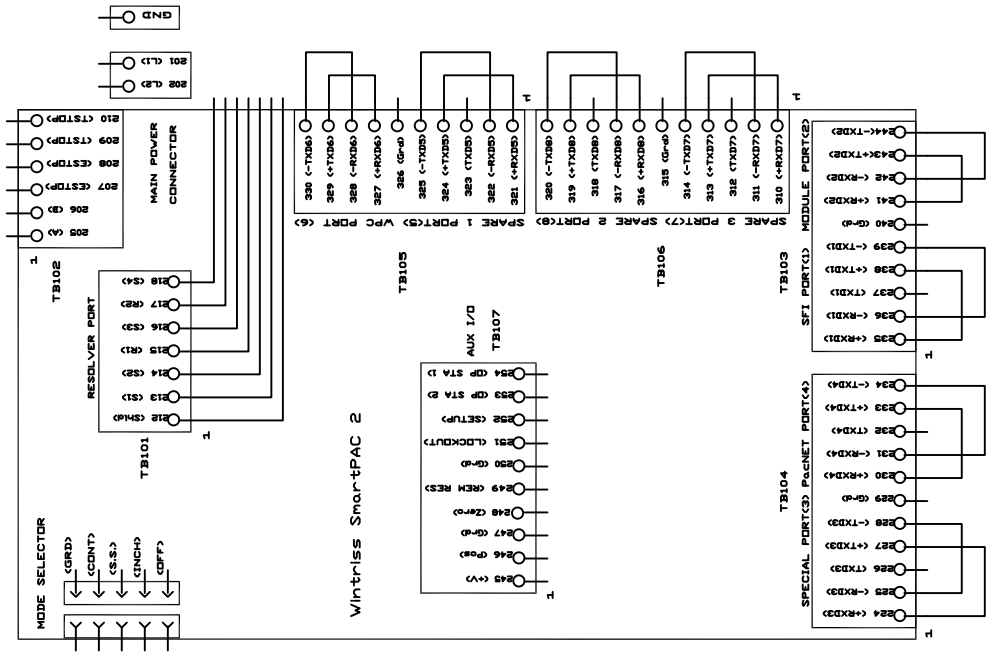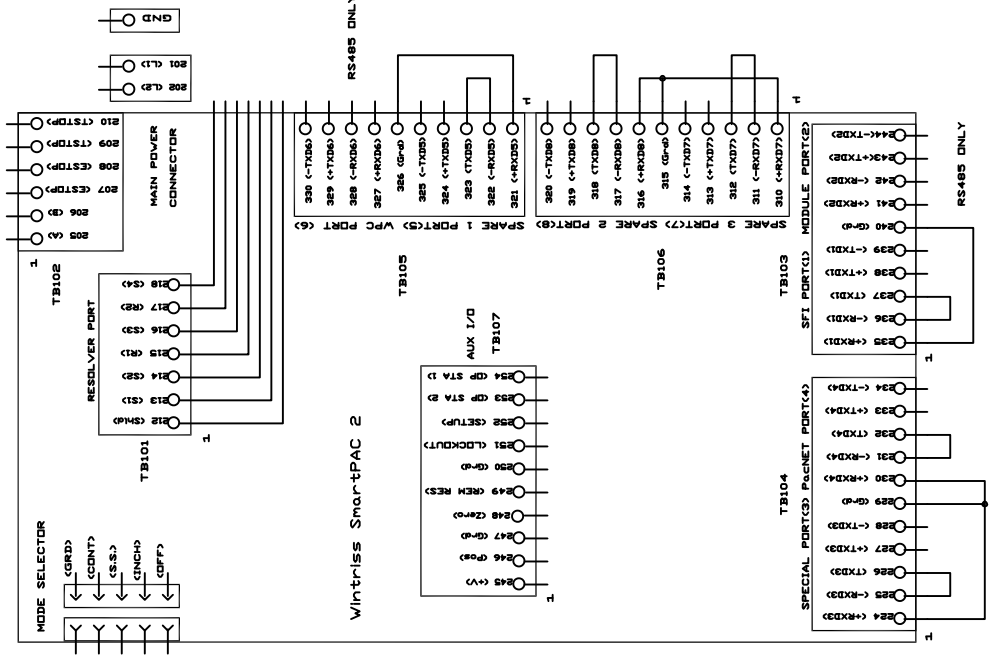4 (CHAS)
3 (GND)
2 (L2)
1 (L1)

TB105 INPUT 1 LEFT
1 (SHIELD)
2 (-INPUT)
3 (+INPUT)
4 (-EX)
5 (+EX)

TB106 INPUT 2 RIGHT
1 (SHIELD)
2 (-INPUT)
3 (+INPUT)
4 (-EX)
5 (+EX)

AUTOSETPAC 2 INPUT   TB101B
1 (REM RESET)
2 (ZERO CAM)
3 (AUX)
4 (+12 VDC)
5 (GND)
6 (INI REC)
7 (INE REC)
8 (SETUP/DISABLE)

TB104 COMM.
1 (SHL)
2 (+TX)
3 (-TX)
4 (+RX)
5 (-RX)

GRN
RED
BRN
ORG
BLK

CONNECT SHIELD TO THE ENCLOSURE AT THE CONDUIT ENTRY POINT

Cut off and do not use the Yellow wire.

Use Wintriss cable:
30 feet - #4328501
100 feet - #4328502

Wintriss SmartPAC Pro RTS

TB4   STOP CIRCUITS
210 (TSTOP)
209 (TSTOP)
208 (ESTOP)
207 (ESTOP)
206 (B)
205 (A)

WPC PORT(5)
330 (-TXD6)
329 (+TXD6)
328 (-RXD6)
327 (+RXD6)
326 (Gnd)

TB8 1
CAN BUS
(CN+)
(SHL)
(CN-)
TB1 1

AUX I/O TB5
254 (SP 1)
253 (SP 2)
252 (SETUP)
251 (LOCKOUT)
250 (GND)
249 (REM RES)
248 (ZERD)
247 (GND)
246 (POS SEN)
245 (+24 VDC)

TB6 MODULE PORT(2)
244 (-TXD2)
243 (+TXD2)
242 (-RXD2)
241 (+RXD2)
240 (Gnd)

GRN
RED
BRN
ORG
BLK

SF1 PORT(1)
239 (-TXD1)
238 (+TXD1)
237 (-RXD1)
236 (+RXD1)
235 (+RXD1)

CONNECT SHIELD TO THE ENCLOSURE AT THE CONDUIT ENTRY POINT

TB2 INPUT POWER
201 (GND)
202 (+24)

J7 EXPANSION PORT
9 (S3)
11 (DAC1)
12 (AN7)
13 (DAC2)
15 (GND)
17 (+24)
18 (+5)

J10   USB OUT

RESOLVER PORT TB3
218 (S4)
217 (R2)
216 (S3)
215 (S2)
214 (S1)
213 (R1)
212 (SHLD)

SPECIAL PORT(3) COMM PORT(4)
234 (-TXD4)
233 (+TXD4)
232 (TXD4)
231 (-RXD4)
230 (+RXD4)
229 (Gnd)
228 (-TXD3)
227 (+TXD3)
226 (-RXD3)
224 (+RXD3)

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| DRAWN ADB | DATE 10/15/18 |
| CHK. | |

TITLE
120 VAC AutosetPAC 2 Channel with SmartPAC Pro wiring diagram

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CODE IDENT NO.	SIZE C	DRAWING NUMBER	REV
FILENAME		FIGURE 8	
REL	SCALE	SHEET OF	

Figure 9 — 120 VAC AutosetPAC 4 Channel with SmartPAC Pro wiring diagram

WINTRISS CONTROLS GROUP

TITLE: 120 VAC AutosetPAC 4 Channel with SmartPAC Pro wiring diagram

DRAWING NUMBER: FIGURE 9

SIZE: C

DRAWN: ADB   DATE: 2/28/18

REVISIONS

REV	DESCRIPTION	DATE	APP'D

RS 232 CONNECTIONS

RS 485 CONNECTIONS

Wintriss SmartPAC Pro RTS

STOP CIRCUITS

TB4
205 (A)
206 (B)
207 (ESTOP)
208 (ESTOP)
209 (TSTOP)
210 (TSTOP)

WPC PORT(5)
330 (-TXD6)
329 (+TXD6)
328 (-RXD6)
327 (+RXD6)
386 (Gnd)

CAN BUS
TB8
CN+
SHLD
CN-
TB1

RS485 ONLY

J10
USB OUT

INPUT POWER
TB2
201 (Pwd)
202 (+24)

J7
EXPANSION PORT
9 (S3)
11 (DAC1)
12 (AN7)
13 (DAC2)
15 (GND)
17 (+24)
18 (+5)

AUX I/O TB5
234 (SP 1)
233 (SP 2)
232 (SETUP)
231 (CLOCKOUT)
250 (GND)
249 (GREN RES)
248 (ZERO)
247 (GND)
246 (POS SEN)
245 (+24 VDC)

RESOLVER PORT TB3
218 (+S4)
217 (CS2)
216 (CS)
215 (R1)
214 (S2)
213 (S1)
212 (SHL4)

SFI PORT(1) MODULE PORT(2)
TB6
235 (+RXD1)
236 (-RXD1)
237 (TXD1)
238 (+TXD1)
239 (-TXD1)
240 (P-P)
241 (+RXD2)
242 (-RXD2)
243 (+TXD2)
244 (-TXD2)

RS485 ONLY

SPECIAL PORT(3) COMM PORT(4)
TB7
224 (+RXD3)
225 (-RXD3)
226 (+RXD3)
227 (+TXD3)
228 (-TXD3)
229 (P-P)
230 (+RXD4)
231 (-RXD4)
232 (TXD4)
233 (+TXD4)
234 (-TXD4)

24 VDC AutosetPAC 4 Channel with SmartPAC Pro wiring diagram

FIGURE 11

WINTRISS CONTROLS GROUP

Option Switch SW101 functions:

Switch 1 - On sets address for second AutosetPAC

Switch 2 - On puts AutosetPAC into 2 channel mode

Switch 3 - On forces new firmware download always
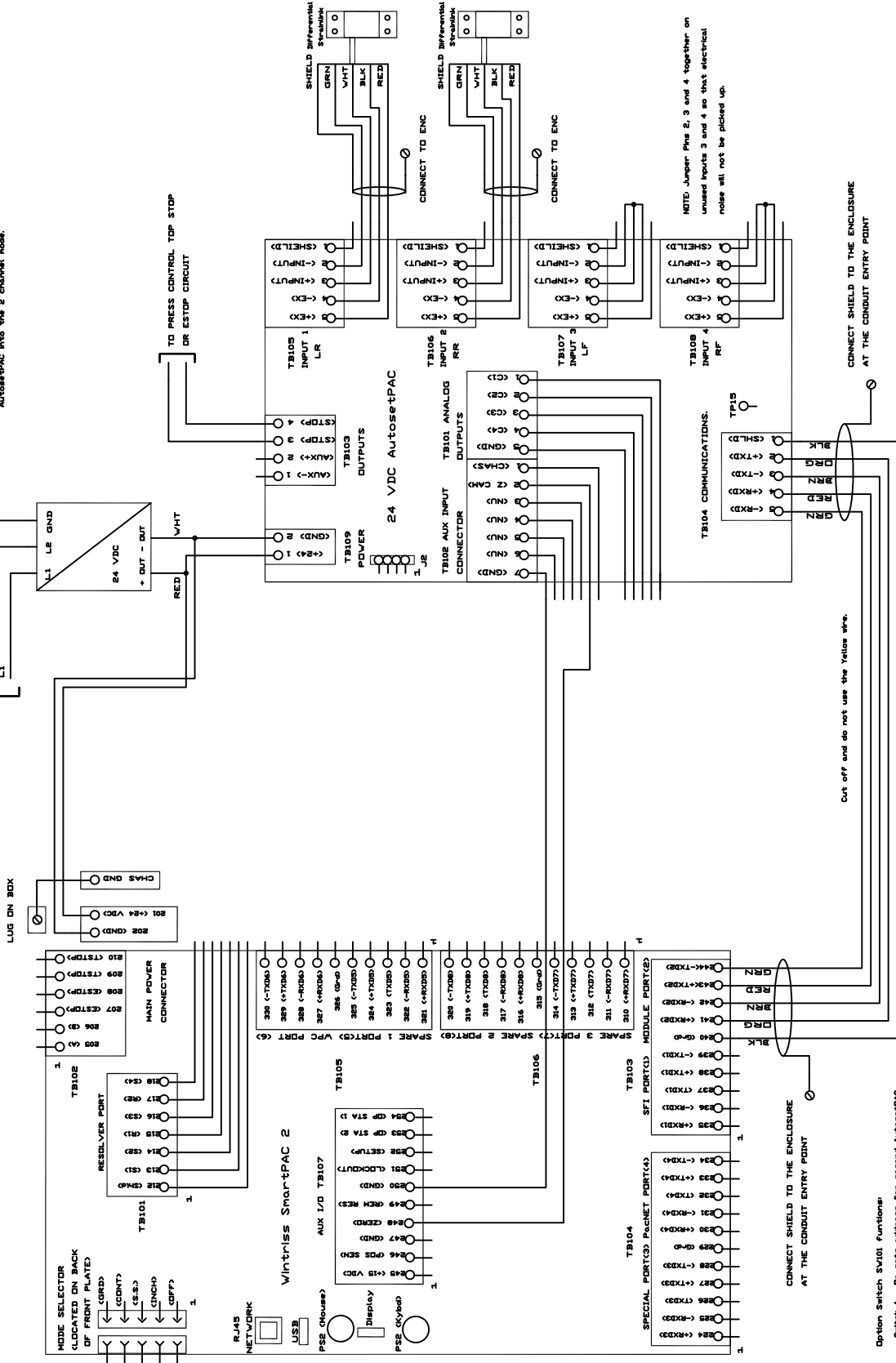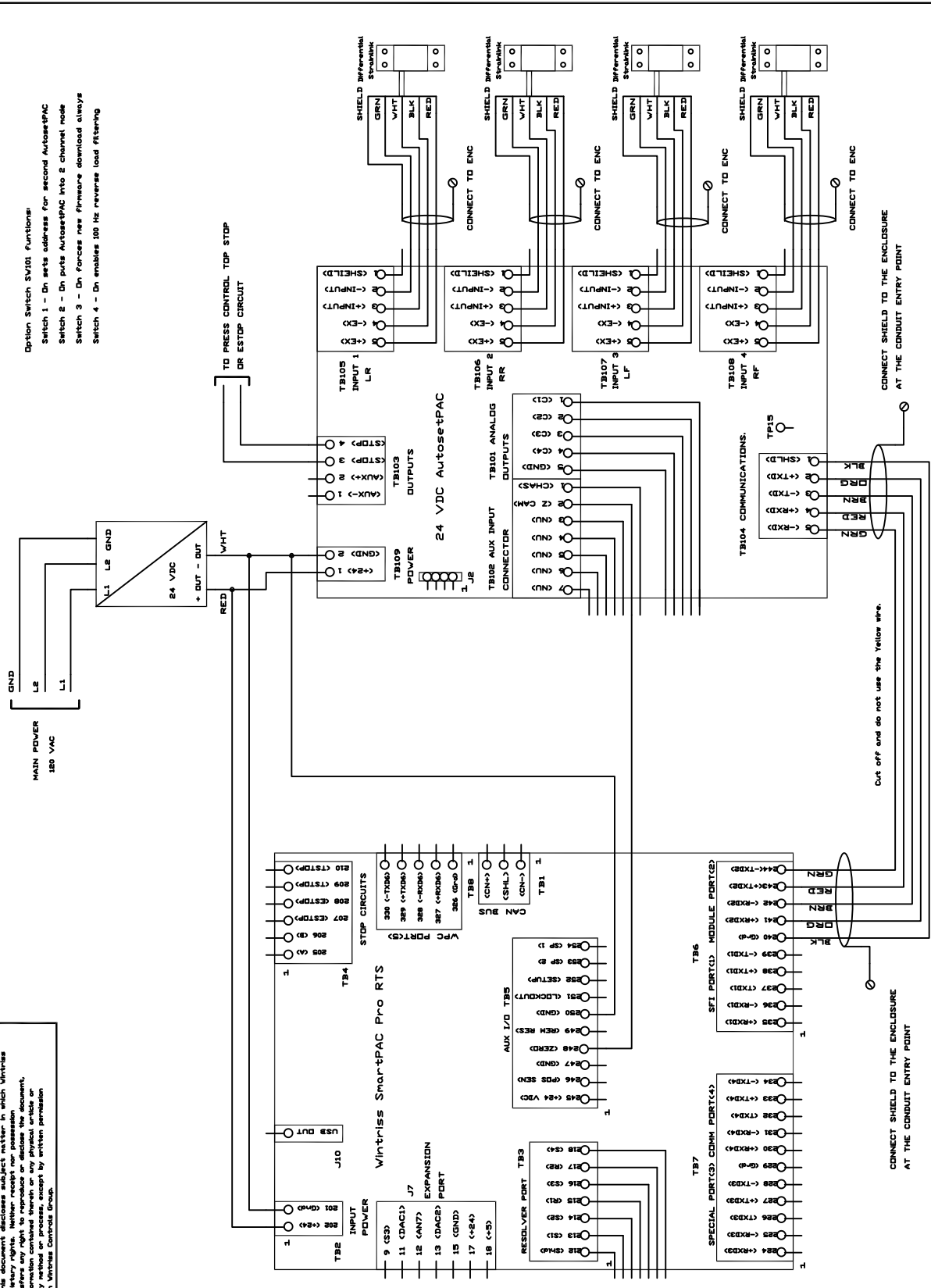
Switch 4 - On enables 100 Hz reverse load filtering

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Option Switch SW101 functions:

Switch 1 - On sets address for second AutosetPAC

Switch 2 - Turn this on for AutosetPAC 2 channel mode

Switch 3 - On forces new firmware download always

Switch 4 - On enables 100 Hz reverse load filtering

NOTE: Set option switch SW101 switch number 2 on to set the AutosetPAC into the 2 channel mode.

TO PRESS CONTROL TOP STOP OR ESTOP CIRCUIT

SHIELD Differential Strainlink
GRN WHT BLK RED
CONNECT TO ENC

SHIELD Differential Strainlink
GRN WHT BLK RED
CONNECT TO ENC

NOTE: Jumper Pins 2, 3 and 4 together on unused inputs 3 and 4 so that electrical noise will not be picked up.

TB105 INPUT 1 LR
TB106 INPUT 2 RR
TB107 INPUT 3 LF
TB108 INPUT 4 RF

5 (+EX)
4 (-EX)
3 (+INPUT)
2 (-INPUT)
1 (SHIELD)

TB103 OUTPUTS
4 (STOP)
3 (STOP)
2 (AUX+)
1 (AUX-)

24 VDC AutosetPAC

TB101 ANALOG OUTPUTS
1 (C1)
2 (C2)
3 (C3)
4 (C4)
5 (GND)
6 (CHAS)

TB102 AUX INPUT CONNECTOR
1 (Z CAM)
2 (NU)
3 (NU)
4 (NU)
5 (NU)
6 (NU)
7 (NU)

TB109 POWER
2 (GND)
1 (+24)
J2

TB104 COMMUNICATIONS
1 (SHLD)
2 (+TXD) BLK
3 (-TXD) ORG
4 (+RXD) BRN
5 (-RXD) RED
GRN

TP15

CONNECT SHIELD TO THE ENCLOSURE AT THE CONDUIT ENTRY POINT

MAIN POWER 120 VAC
GND L2 L1

24 VDC
L1 L2 GND
+ OUT - OUT
WHT
RED

Use Wintriss cable:
30 feet - #4328501
100 feet - #4328502

Cut off and do not use the Yellow wire.

CONNECT SHIELD TO THE ENCLOSURE AT THE CONDUIT ENTRY POINT

Wintriss SmartPAC Pro RTS

TB4 STOP CIRCUITS
205 (A)
206 (B)
207 (ESTOP)
208 (ESTOP)
209 (TSTOP)
210 (TSTOP)

WPC PORT(5)
326 (GND)
327 (+RXD6)
328 (-RXD6)
329 (+TXD6)
330 (-TXD6)

TB8 CAN BUS
1 (CN-)
2 (SHL)
3 (CN+)

TB1

AUX I/O TB5
245 (+24 VDC)
246 (POS SEN)
247 (GND)
248 (ZERO)
249 (REM RES)
250 (GND)
251 (CLOCKOUT)
252 (SETUP)
253 (SP B)
254 (SP J)

MODULE PORT(2)
240 (P-D)
241 (+RXD)
242 (-RXD)
243 (+TXD)
244 (-TXD)

SFI PORT(1) TB6
235 (+RXD)
236 (-RXD)
237 (+TXD)
238 (-TXD)
239 (P-D)
GRN RED BRN ORG BLK

TB2 INPUT POWER
202 (+24)
201 (PWD)

J10 USB OUT

J7 EXPANSION PORT
9 (S5)
11 (DAC1)
12 (AN7)
13 (DAC2)
15 (GND)
17 (+24)
18 (+5)

RESOLVER PORT TB3
212 (SHL)
213 (S1)
214 (S2)
215 (S3)
216 (R1)
217 (R2)
218 (S4)

SPECIAL PORT(3) COMM PORT(4) TB7
224 (+RXD3)
225 (-RXD3)
226 (+TXD3)
227 (+TXD3)
228 (P-D)
229 (+RXD4)
230 (-RXD4)
231 (+TXD4)
232 (-TXD4)
233 (CR2)
234 (-TXD4)

CONNECT SHIELD TO THE ENCLOSURE AT THE CONDUIT ENTRY POINT

WINTRISS CONTROLS GROUP

DRAWN ADB DATE 2/28/18
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MFG.
FILENAME
REL.

TITLE 24 VDC AutosetPAC 2 Channel with SmartPAC Pro Wiring diagram

CODE IDENT NO.
SIZE C
DRAWING NUMBER FIGURE 12
REV
SCALE
SHEET OF