AZIMUTH

AutoSET 1500
Tonnage monitor

WINTRISS®

User Manual

AutoSet®

Wintriss® Load Analyzers

including 1500 and 1500 Plus Two-channel Models and 1504 and 1504 Plus Four-channel Models

1137200

Rev. L November 2016

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

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  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.

Changes for Revision L of the AutoSet User Manual (1137200)

This revision of the AutoSet user manual covers AutoSet software version 2.28 and higher. The changes include:

- Removed obsolete references.

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How To Use This Manual

This manual shows you how to install, calibrate, operate, and troubleshoot AutoSet 1500, AutoSet 1500 Plus, AutoSet 1504, and AutoSet 1504 Plus load analyzers.

Chapter 1 provides an overview of the operation and features of AutoSet.

Chapter 2 shows you how to mount and wire AutoSet.

Chapter 3 shows you how to calibrate AutoSet.

Chapter 4 shows you how to make the settings AutoSet uses to calculate setpoints and how to establish setpoints for your press.

Chapter 5 shows you how to respond to AutoSet faults, troubleshoot common AutoSet problems, and use the LEDs on the AutoSet processor board as diagnostic tools.

Appendix A provides tables of wiring connections and AutoSet processor board settings.

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

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.

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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 (LETS/SFC and SBR), 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.

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AUTOSET
USER MANUAL
1137200

Chapter 1. Introduction

The AutoSet family of load analyzers provides overload protection for your press and dies without the need to update settings on each die change. AutoSet creates load limits, or setpoints, automatically for every job. Setpoints can be changed immediately based upon the actual load of your press.

Four AutoSet models are available: AutoSet 1500, AutoSet 1504, AutoSet 1500 Plus, and AutoSet 1504 Plus. AutoSet 1500s are two-channel load analyzers. AutoSet 1504s are four-channel units. Standard AutoSets allow you to establish setpoints for high tonnage. On AutoSet Plus units, you can also establish setpoints for stroke-to-stroke tonnage variation, or repeatability. In addition, with AutoSet Plus you can display reverse tonnage.

Standard AutoSet Benefits

Standard AutoSet 1500 and 1504 load analyzers provide the following benefits:

- Identify machine overloading, enabling you to prevent unnecessary wear on load-bearing components
- Stop the press after a bad stroke, preventing successive bad hits and, possibly, catastrophic damage to the die
- Allow 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).
- Enable better matching of dies to press capacity. Since AutoSet 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.
- 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 AutoSet stops the press when these and other malfunctions are detected.
- Diagnose tool wear by monitoring tonnage increases as a die is re-used. This monitoring capability enables you to schedule repairs to dies and punches, resulting in more efficient use of the press, faster parts production, and higher quality parts.

AutoSet Plus Benefits

AutoSet 1500 Plus and 1504 Plus load analyzers deliver the following benefits in addition to those offered by standard AutoSets:

- Provide repeatability, or stroke-to-stroke, tonnage monitoring. When variation in tonnage from one stroke to the next exceeds the repeatability setpoint, AutoSet displays an error and stops the press. 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 setpoint tolerance, thus avoiding nuisance stops due to acceptable variance in material thickness and hardness.

- Display 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.

AutoSet Front Panel

AutoSet 1500 and AutoSet 1504 Plus front panels are shown in Figure 1-1 and Figure 1-2, page 1-3. The front panels of the AutoSet 1500 Plus and standard 1504 units are similar. Controls and displays appearing on the AutoSet front panel are described below.

- **Channel Load LED Display.** Each of these three-digit LED displays shows the tonnage measured at the corresponding strain link. On AutoSet 1500 units, there are two displays, one for each strain link; on 1504 AutoSets, there are four. Each Load display can be set to show tonnage in tenths of a ton up to 100 tons. Channel Load LED displays flash when a fault occurs on that channel.
- **Total Load LED Display.** This four-digit LED display, which appears only on AutoSet 1504 and 1504 Plus units, shows the sum of the tonnages on all four strain link channels. This display can be set to show tonnage in tenths of a ton up to 400 tons. The Total Load LED display flashes when a fault occurs on any channel.
- **Channel Setpoints LED Display.** Each of these three-digit LED displays shows the load limit, or setpoint, that has been established for the corresponding strain link. On AutoSet 1500 units, there are two displays; on 1504 AutoSets there are four.

  Setpoints displays on standard 1500 and 1504 AutoSets show setpoints for high tonnage. Setpoints displays on AutoSet 1500 Plus and 1504 Plus units may show either high tonnage or repeatability setpoints, depending on the position (i.e., HIGH or REPEATABILITY) to which the DISPLAY switch (see page 1-4) is set.

  AutoSet creates setpoints automatically based on the measured load and stops the press if one of these limits is exceeded. Setpoints LED displays flash when a fault occurs on that channel and show an abbreviation indicating the type of fault (e.g., HI, rEP, etc.).
- **RESET Button.** This button is found only on standard AutoSet 1500 and 1504 load analyzers. It has two functions.

  Depressing the button briefly (i.e., for less than two seconds) resets the load analyzer after a fault.

  Depressing the button (and holding it down) for more than two seconds signals AutoSet to recalculate setpoints. The button should be depressed until the values shown in the Setpoints displays blink once and change to 120% of the full-scale tonnage.

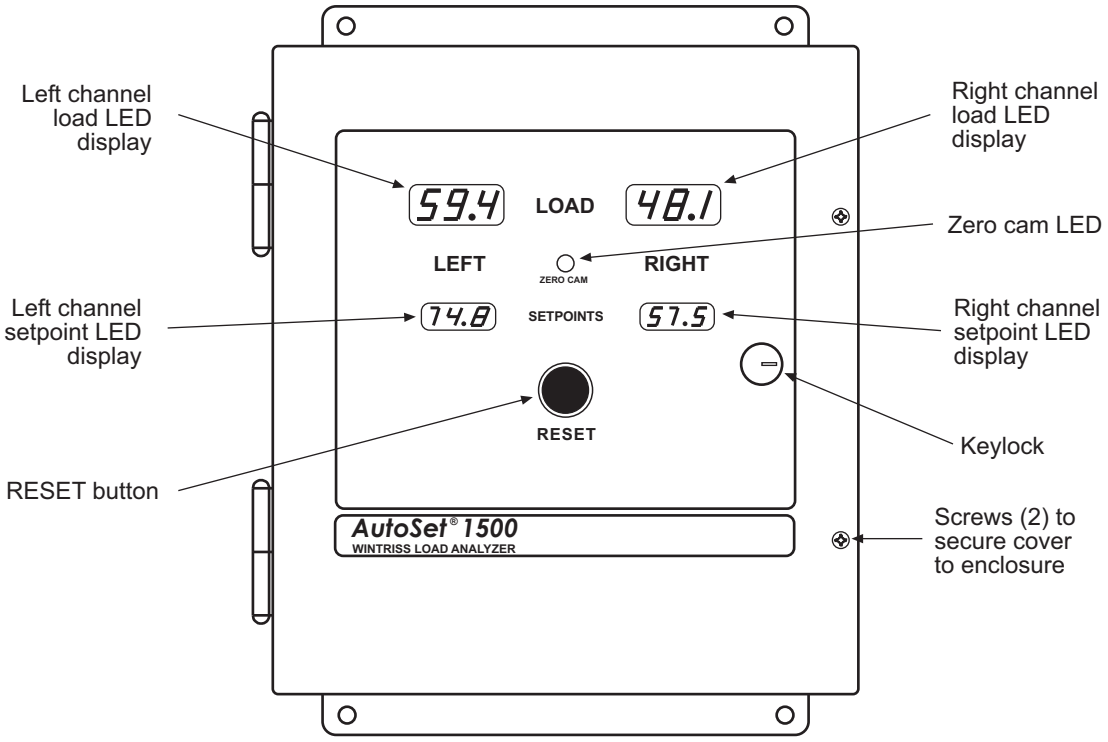


Figure 1-1. AutoSet 1500 Front Panel

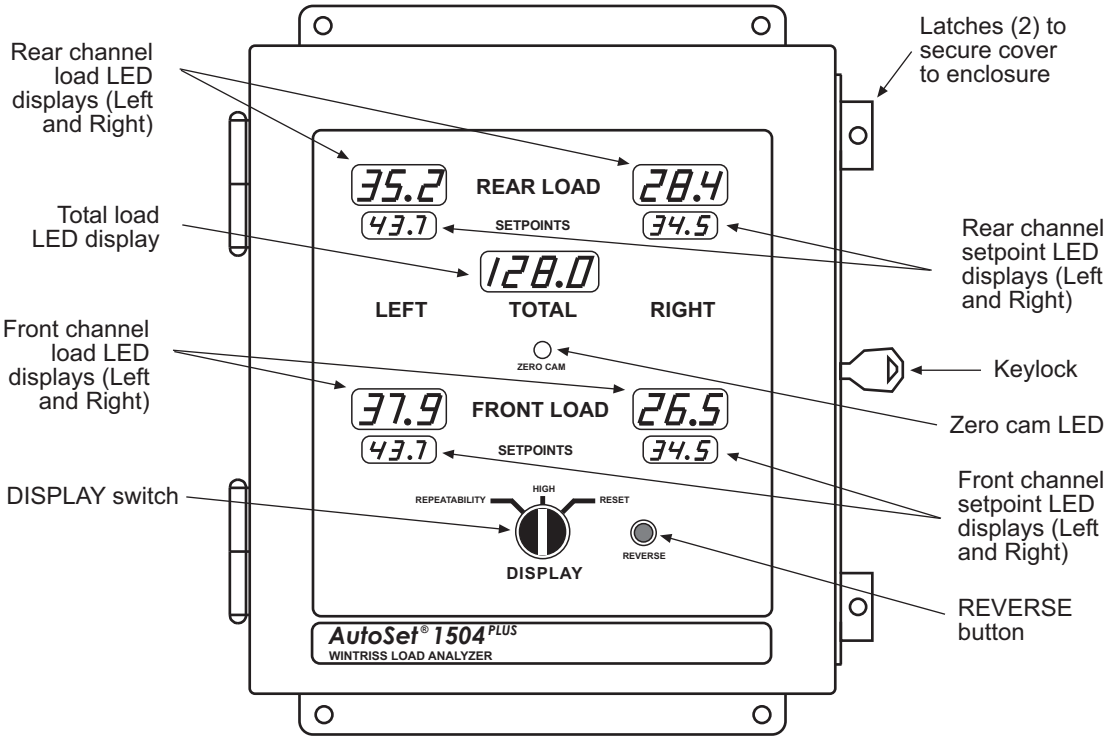


Figure 1-2. AutoSet 1504 Plus Front Panel

- **DISPLAY Switch.** This switch is found only on AutoSet 1500 Plus and 1504 Plus models. It has three settings: from left to right, REPEATABILITY, HIGH, and RESET.

  When the switch is set to "HIGH," the Setpoints LED displays show setpoints for high tonnage.

  When the switch is turned to the "REPEATABILITY" position, repeatability setpoints appear in the Setpoints displays.

  The "RESET" position has the same functionality as the RESET button on standard AutoSet 1500 and 1504 units. Turning the switch briefly to "RESET" (i.e., for less than two seconds) resets the load analyzer after a fault. Turning the switch to the "RESET" position (and holding it there) for more than two seconds signals AutoSet to recalculate setpoints.
- **Zero Cam LED**. Illuminates when the zero cam switch is on (i.e., between 240^{o} and 30^{o}). The zero cam, which is standard on AutoSet 1500 Plus and 1504 Plus analyzers but optional on standard 1500 and 1504 AutoSets, clears the tonnage reading for the previous stroke so the tonnage reading for the current stroke can be displayed.
- **REVERSE Button.** This button appears only on AutoSet 1500 Plus and 1504 Plus units. Pressing the REVERSE button causes reverse tonnage values to replace forward tonnage readings in the Load LED displays. The abbreviation "rEV" appears in the Setpoints LED displays to indicate that reverse tonnage is being shown. Pressing the REVERSE button again returns the Load LED displays to forward tonnage values.
- **Keylock and Screws** (AutoSet 1500 and 1500 Plus). The keylock enables the AutoSet enclosure to be locked and the key removed, preventing unauthorized changes to settings. In addition, the cover can be secured to the enclosure with two Phillips screws. To make settings inside the enclosure, simply loosen the screws, turn the keylock to its "open" position, and swing the cover open.
- **Keylock and Cover Latches** (AutoSet 1504 and 1504 Plus). The keylock on AutoSet 1504 and 1504 Plus units is located on the right side of the enclosure rather than on the cover but, otherwise, functions identically to the keylock on AutoSet 1500 and 1500 Plus load analyzers. The cover can be secured to the enclosure with two latches, located on the enclosure's right side. To make settings inside the enclosure, simply release the latches, turn the keylock to its "open" position, and swing the cover open.

Strain Links

AutoSet 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 AutoSet 1500 and 1500 Plus models, four strain links with AutoSet 1504 and 1504 Plus units. Instructions on how mount and wire strain links are provided starting on page 2-10. Zeroing strain links is covered starting on page 3-1.

Calibration

AutoSet 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 AutoSet until they match the tonnage readings on the independent load monitor. Instructions for calibrating AutoSet are provided in Chapter 3.

AutoSet Operation

AutoSet creates and displays setpoints automatically based on settings you make inside the AutoSet enclosure. On standard AutoSet 1500 and 1504 units, you make two settings: sample period and percent high tolerance. On AutoSet 1500 Plus and 1504 Plus models, you make three settings: sample period, percent high tolerance, and percent repeatability tolerance.

The sample period is the number of strokes during which AutoSet collects tonnage information to use in calculating setpoints. Percent high tolerance is the percentage above the measured load at which AutoSet establishes high tonnage setpoints. Percent repeatability tolerance is the percent of stroke-to stroke variation in the measured load at which AutoSet establishes repeatability setpoints.

AutoSet uses the settings you specify for percent high tolerance and percent repeatability tolerance to calculate setpoints for all dies used on the press. (If you want different settings used for individual dies, you must change settings.) AutoSet displays the results of its calculations in the Setpoints LED displays on the front panel. Two setpoints are shown for 1500 and 1500 Plus AutoSets, four setpoints for 1504 and 1504 Plus units.

Only high setpoints are displayed on standard AutoSet 1500 and 1504 units. On AutoSet 1500 Plus and 1504 Plus models, either high or repeatability setpoints are displayed, depending on the position to which you set the DISPLAY switch (i.e., “HIGH” or “REPEATABILITY”).

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

NOTICE

AUTOSET SETPOINTS NEVER EXCEED 120%

AutoSet will not create setpoints greater than 120% of the full-scale capacity of the press.

AutoSet calculates new setpoints whenever the RESET button is depressed for at least two seconds (1500 and 1504 AutoSets) or the DISPLAY switch is turned to “RESET” and held for at least two seconds (1500 Plus and 1504 Plus units). Setpoints are displayed after the sample period is completed. AutoSet also calculates new setpoints whenever you change the percent high tolerance or percent repeatability tolerance setting.

Complete instructions for setting the sample period, percent high tolerance, and percent repeatability tolerance on AutoSet are provided in Chapter 4.

AutoSet Faults

AutoSet stops the press whenever the measured tonnage exceeds the high setpoint or the stroke-to-stroke tonnage variation exceeds the repeatability setpoint for one or more of the strain links.

To clear the error condition, you press the RESET button (AutoSet 1500) or turn the DISPLAY switch to the RESET position (AutoSet 1504). The button or switch should be held for less than two seconds; otherwise, AutoSet will recalculate setpoints.

AutoSet fault conditions are covered in Chapter 5.

AutoSet Specifications

AutoSet specifications are shown in Table 1-1.

Table 1-1. AutoSet Specifications

Equipment	System 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
Operating temperature	32^{o} to 122^{o} F (0^{o} to 50^{o} C)
Relay contact rating	4 amps @ 120 or 240 Vac Normally open, held closed
Speed	to 2000 SPM
Display	AutoSet 1500/1500+ Two 3-digit .43” (10.9 mm) high for tonnages Two 3-digit .30” (7.6 mm) high for setpoints AutoSet 1504/1504+ Four 3-digit .43” (10.9 mm) high for tonnages Four 3-digit .30” (7.6 mm) high for setpoints One 4-digit .43” (10.9 mm) high for total tonnage
Strain links Size Cable	Two (1500/1500+) or four (1504/1504+) provided 3.75” (95.3 mm) x 1.19” (30.2 mm) x 0.75” (19.1 mm) 30 ft. (9.1 m) standard, other lengths optional
Drill jig	One provided

Chapter 2. Installation

⚠ DANGER

ELECTRIC SHOCK OR HAZARDOUS ENERGY

Disconnect main power before installation.

- Remove all power to the press, press control, and other equipment used with the press.
- Remove all fuses and "tag out" per OSHA 1910.147 Control of Hazardous Energy (Lockout/Tagout).
- Ensure that installation is performed by qualified personnel.
- Complete all installation and wiring procedures before connecting to the AC power source.

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

This chapter shows you how to install the AutoSet control enclosure or AutoSet panel mount and make wiring connections for AC power, stop circuits, strain links, zero cam, and other devices. It is organized in the following sections:

Mounting AutoSet

Instructions for installing the enclosure and panel-mount versions of AutoSet are provided in the following sections. When determining a convenient mounting location prior to installation, consider the following factors:

- Ideally, AutoSet should be mounted as close as possible to the press control so that operators and setup personnel can easily see the readouts and access the RESET button or DISPLAY switch.
- AutoSet should be installed at a height convenient for all users.
- Strain link cables must be capable of reaching the mounting site.

Mounting an AutoSet Enclosure

AutoSet 1500 (see Figure 2-1, page 2-2) and 1504 (see Figure 2-2, page 2-2) enclosures have roughly the same mounting dimensions. AutoSet 1504 enclosures are slightly wider because of the bracket clamps mounted on the side. AutoSet 1500/1504 Plus units are deeper because of the projection of the DISPLAY switch.

To mount the AutoSet enclosure, follow these steps:

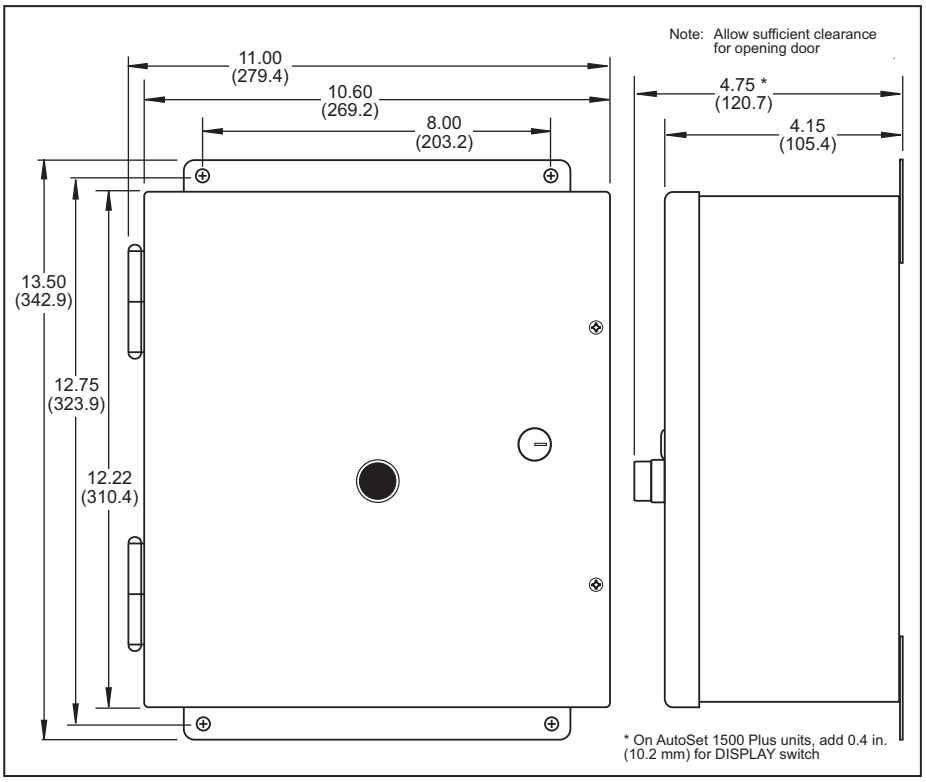


Figure 2-1. AutoSet 1500 Mounting Dimensions

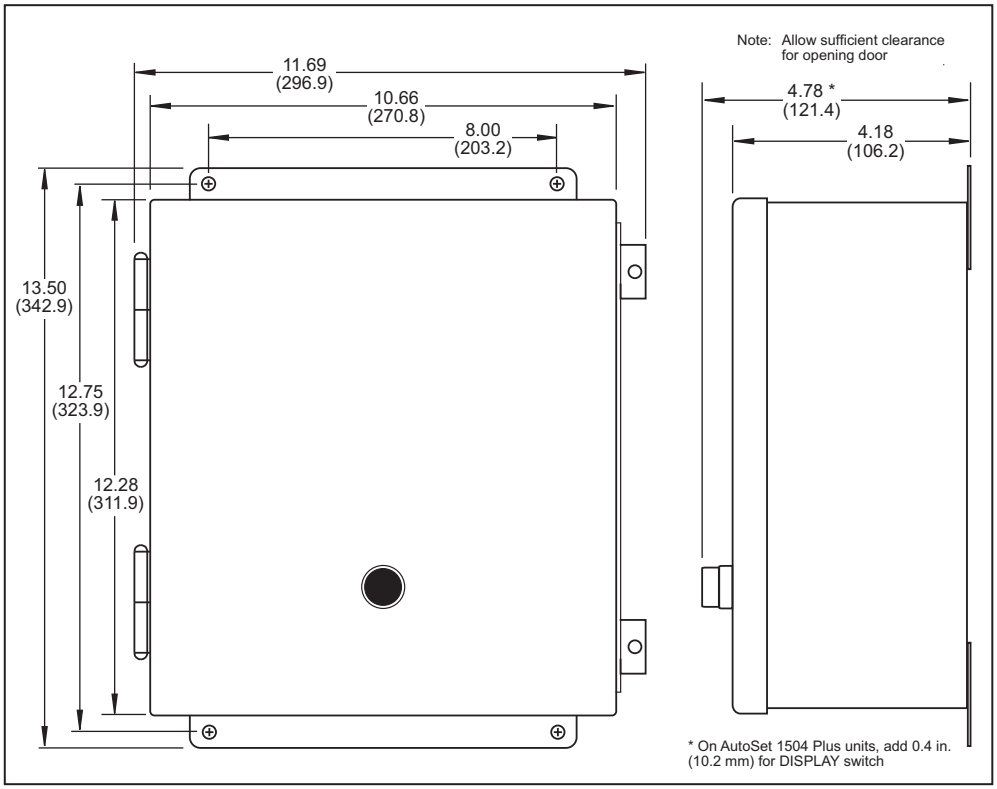


Figure 2-2. AutoSet 1504 Mounting Dimensions

1. Determine a convenient mounting location for the enclosure, considering the following factors in addition to the ones discussed on page 2-1:
   - Ideally, the enclosure should be mounted so its top edge is at approximately chin level.
   - Mounting location must allow enough room for the door to open at least 120°.
   - Enclosure can be mounted on the press or a free-standing pedestal.
2. Drill holes for mounting, referring to Figure 2-1 (AutoSet 1500) or Figure 2-2 (AutoSet 1504). 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.

> **NOTICE**
>
> **METRIC SHOCK MOUNTS**
>
> If you have ordered metric shock mounts with your AutoSet 1500 Plus or 1504 Plus Load Analyzer, shock mount studs are M6X1. Use a 5 mm drill bit, and drill the holes 12 mm deep.

Installing an AutoSet Panel Mount

If you have received a panel-mount version of AutoSet, perform the following steps to install the panel mount in your enclosure or console, referring to Figure 2-3, page 2-4 for mounting and cutout dimensions.

1. Determine a convenient location within your enclosure or console to mount the AutoSet, considering the factors discussed on page 2-1. The panel mount is usually installed from outside the enclosure. Be sure to allow at least 4” (100 mm) of clearance behind the panel mounting plane for the wiring connections.
2. Cut out a hole in your enclosure or console, referring to Figure 2-3 for cutout dimensions. Drill and tap fourteen holes for 1/4-20 screws, also referring to Figure 2-3.
3. Prop the AutoSet panel mount near the cutout location (for example, by connecting ty wraps from two of the left holes in the panel to the corresponding holes in the enclosure, creating a hinge).
4. Perform wiring connections as shown in the following sections. Make sure all cables will reach the connectors on the panel mount, allowing at least 9” (230 mm) of service loop.

When the final checkout has been completed (see *Final Checkout*, page 3-20), install the AutoSet panel mount in the enclosure, using fourteen 1/4-20 screws.

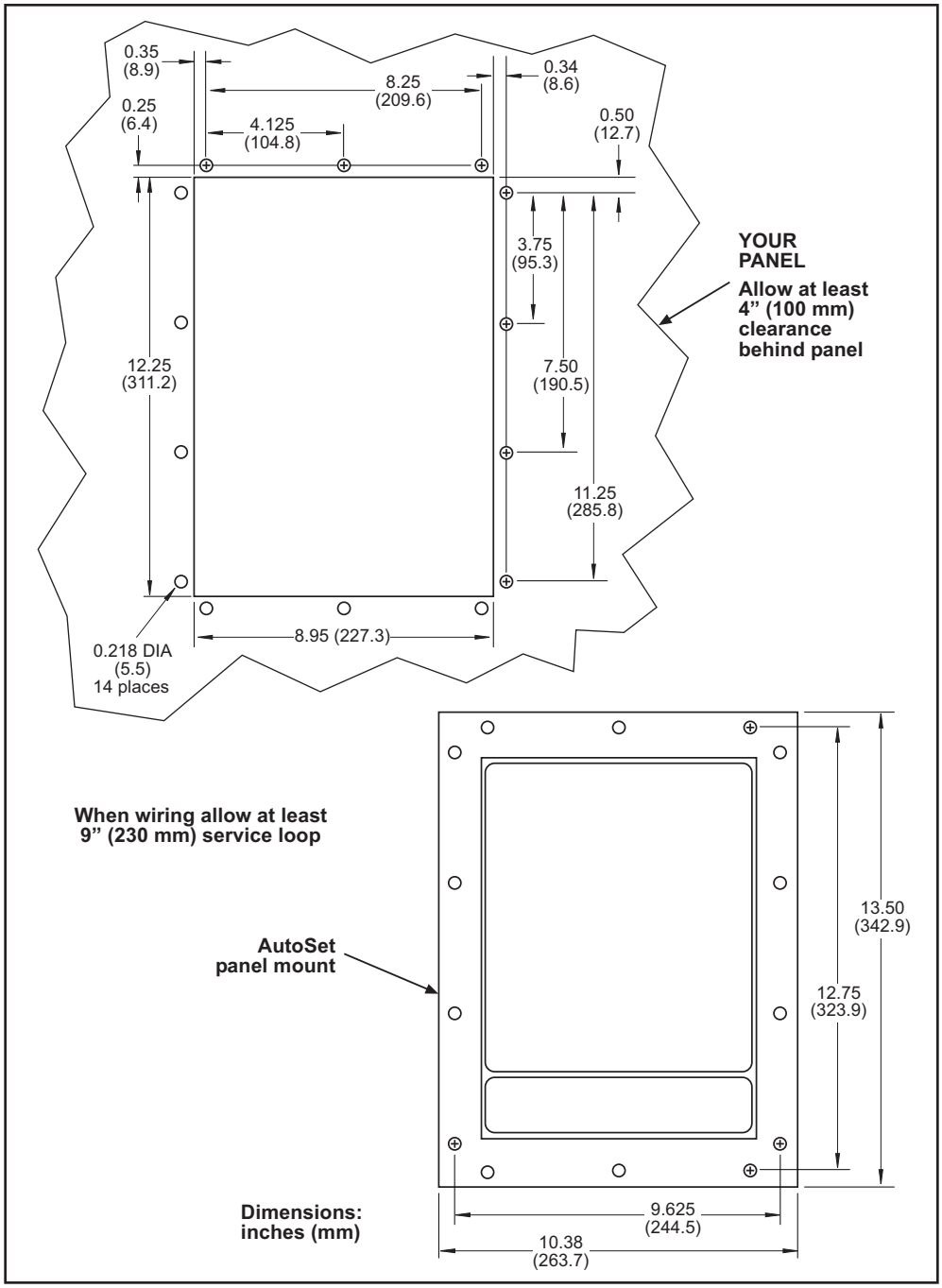


Figure 2-3. AutoSet Panel Mount: Mounting and Cutout Dimensions

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 AutoSet processor board (see Figure 2-4, page 2-6 for AutoSet 1500 or Figure 2-5, page 2-7 for AutoSet 1504). To make wiring connections, do the following:

> **⚠ WARNING**
>
> **ELECTRIC SHOCK HAZARD**
>
> - Do not connect the AC power source until you are done with all other installation procedures.
> - Turn off and disconnect power from the machinery AutoSet 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.**

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; No. 14 wire may be required by local codes.

   > **NOTICE**
   >
   > Wintriss recommends that you connect AutoSet 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 AutoSet will stop the press.

2. Determine how you will connect the wires from AutoSet to your press control stop circuit. You need two wires. No. 16 wire is recommended; No. 14 wire may be required by local codes. Wires should be connected to the top-stop circuit to prevent the press from sticking on the bottom of its stroke when AutoSet stops the press due to an overload.
3. Open the cover of the control enclosure and locate the 115V-230V voltage selector switch (S110) in the upper right corner (see Figure 2-4 or Figure 2-5). It should be set to 115 V, the factory setting. If your AutoSet will be used with 230 Vac, push the switch down to the “230V” position, using your fingernail or a screwdriver.
4. Run the power and stop circuit wires through flexible liquid-tight conduit to the enclosure. The AutoSet enclosure 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 top right knockout. Leave a small service loop inside the enclosure.

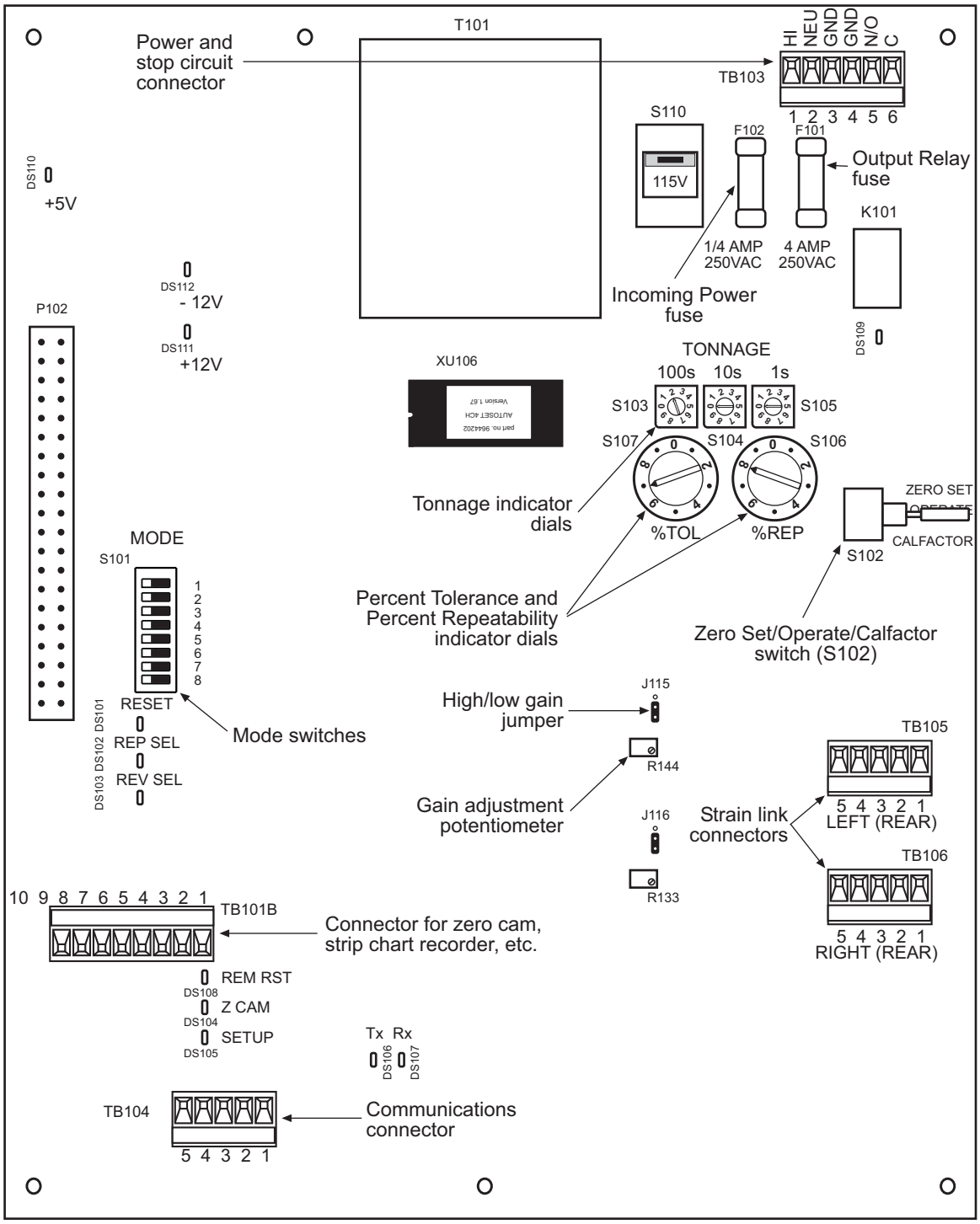


Figure 2-4. AutoSet 1500 Processor Board: Location of Important Components

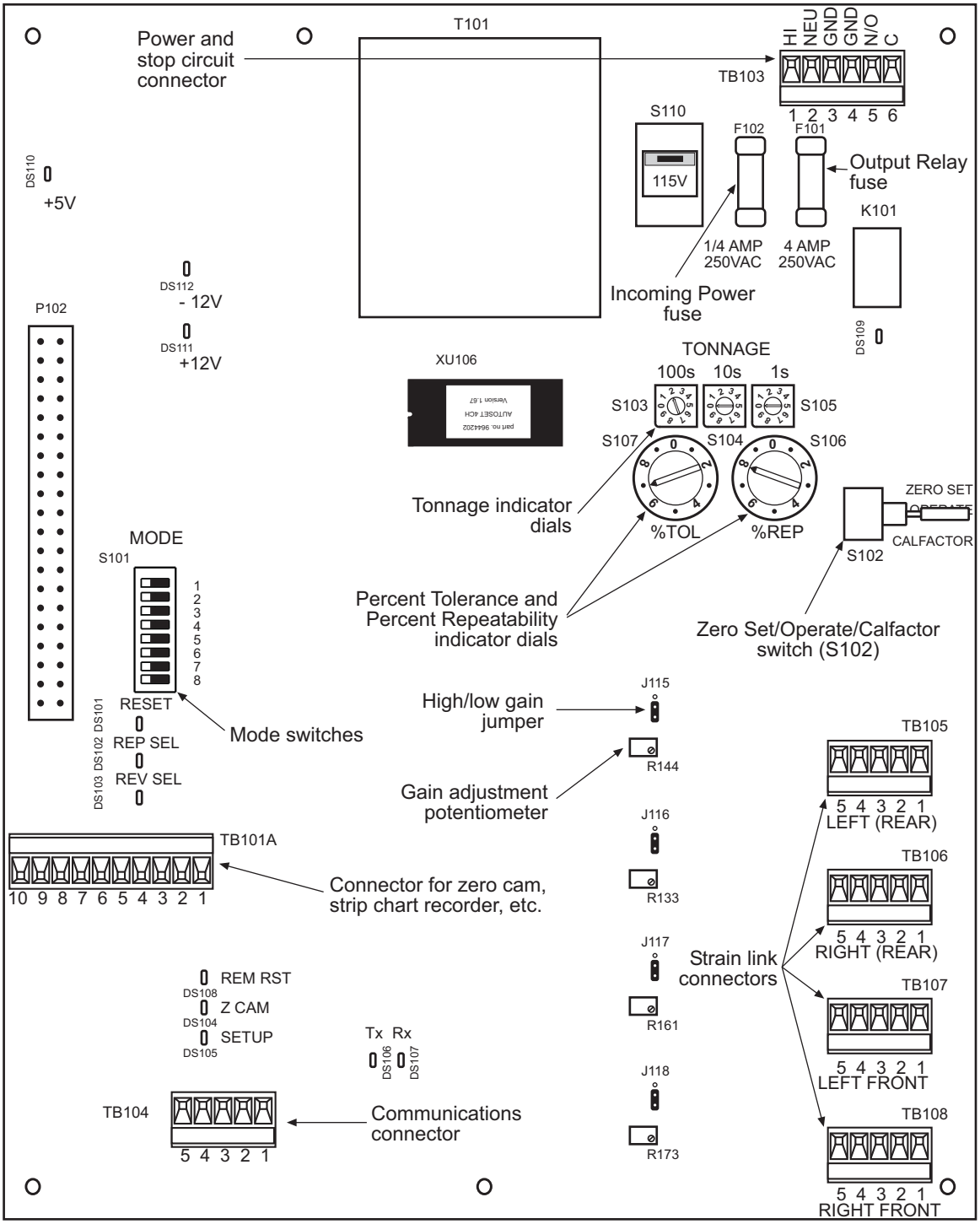


Figure 2-5. AutoSet 1504 Processor Board: Location of Important Components

5. Connect the ground (green or green/yellow) wire to the ground stud on the ceiling of the enclosure at the top right, as shown in Figure 2-6. 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.
6. Remove the connector from terminal block TB103 at the top right of the AutoSet processor board, and connect the remaining AC wires as shown in Figure 2-6 and Table 2-1.

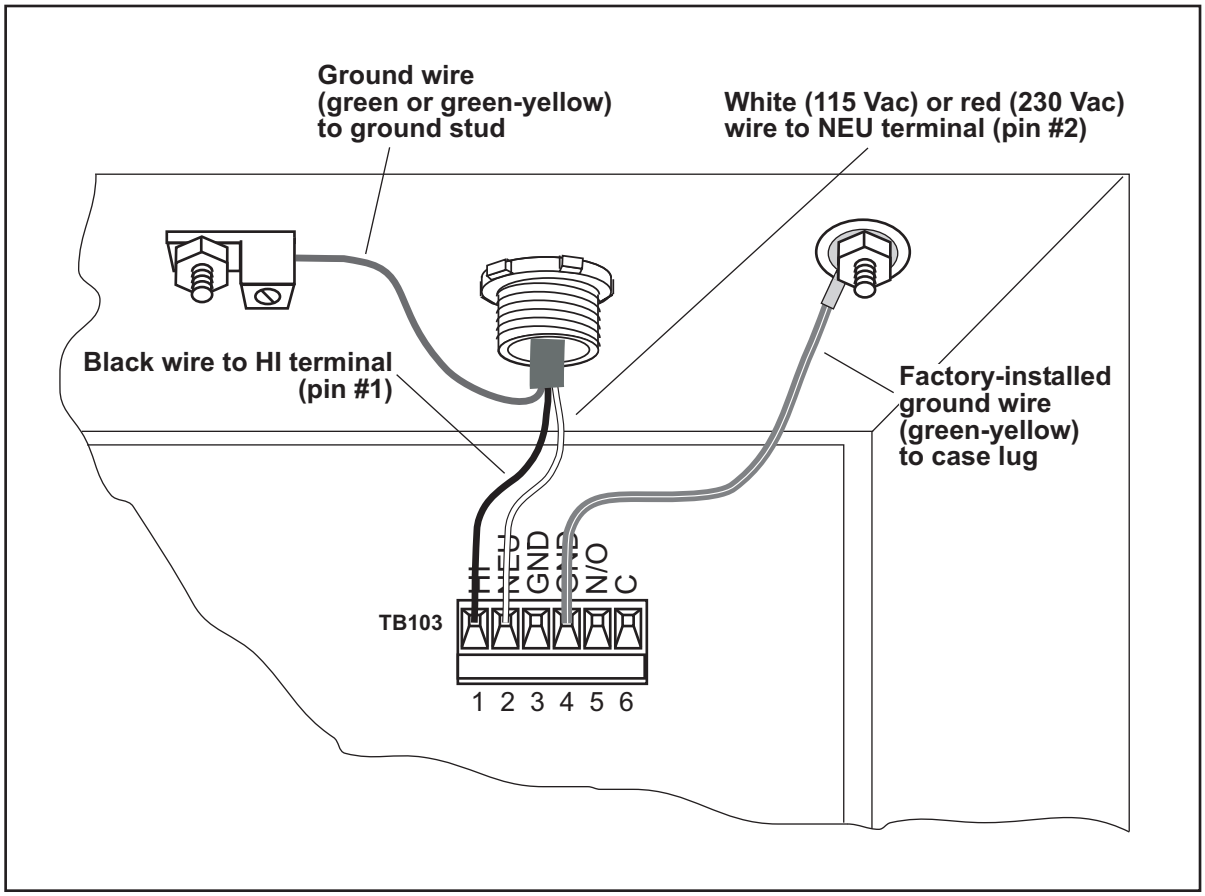


Figure 2-6. AC Power Connections

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

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

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

NOTICE

A ground wire is attached from pin #4 on the TB103 connector to a case lug, as shown in Figure 2-6. 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.

To connect a wire, loosen the screw over the correct slot by turning it counterclockwise (see Figure 2-7). Strip the wire 1/4" (6.4 mm) from the end. Insert the bare wire into the slot 90% of the way. Tighten the screw. The metal tooth inside the slot will clamp down on the bare wire for a tight connection. Make sure the metal tooth is clamped down on the bare part of the wire, not on the insulation. If it is on the insulation, you will have a bad connection.

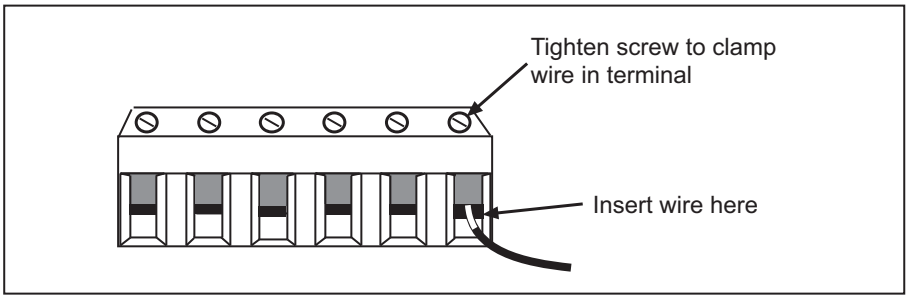


Figure 2-7. Correct Way To Make Terminal Block Connections

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

The TB103 connector can only plug in one way. Make sure 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 plugs 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 you 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 (AutoSet 1500) or four (AutoSet 1504) differential strain links are provided with your AutoSet load analyzer. Part numbers and corresponding cable lengths or connector type for both standard and metric strain links are shown in Table 2-2.

Table 2-2. 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
9647103	9647303	12 in. cable with MS in-line connector
9647104	9647304	60 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 AutoSet unit.

Mounting Strain Links

To mount strain links, perform the following steps, referring to Figure 2-8 for mounting dimensions:

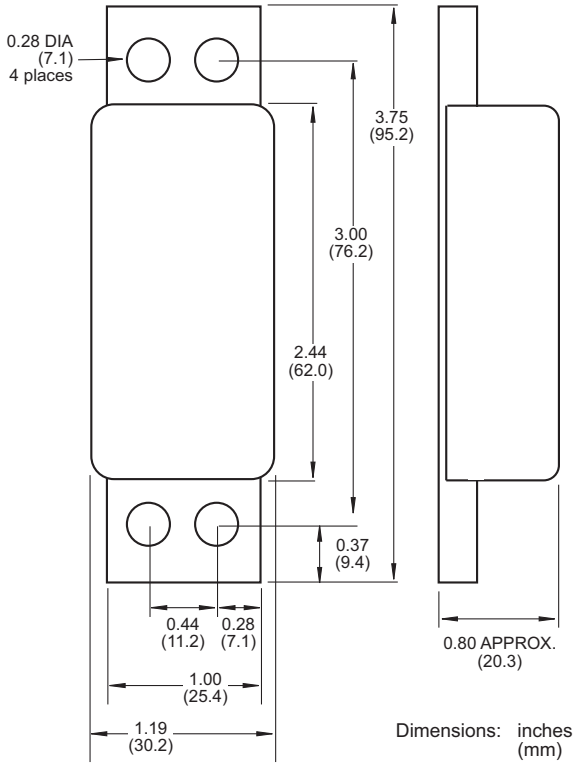


Figure 2-8. Strain Link: Mounting Dimensions

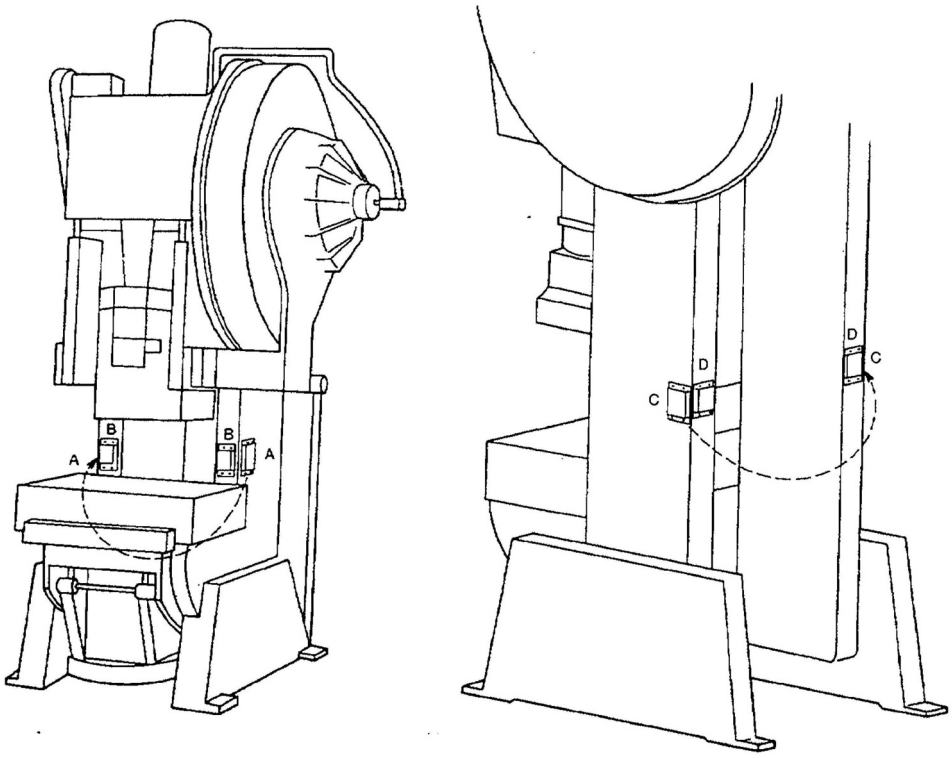
1. Select locations on the press where you plan to mount the strain links.

   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 2-9). 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 AutoSets, strain links are mounted diagonally–for example, one on the left front, one on the right rear (see Figure 2-10, page 2-12). On 4-channel units, strain links are mounted on all four corners.

2. 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.

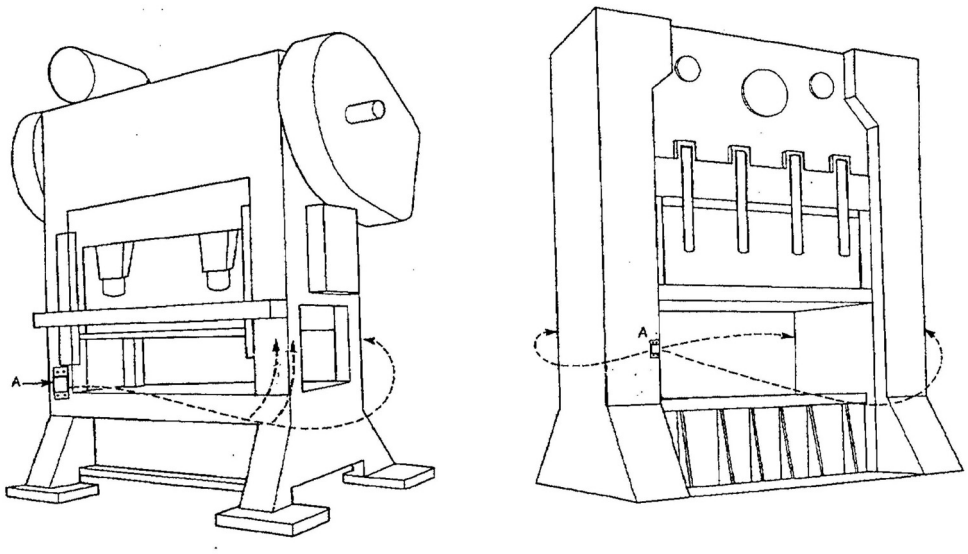
> **NOTICE**
>
> **STRAIN LINKS MUST BE MOUNTED ON A FLAT SURFACE**
> Make sure there are no imperfections, ridges, or cavities on the mounting surface. If strain links are not mounted on a flat surface, they will be difficult or impossible to zero. Irregular surfaces also cause inaccurate tonnage readings.



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

> **⚠ WARNING**
>
> *Use caution when determining an appropriate location for each strain link!* Do not mount any strain link above or below a hole on the press column larger than 1” in diameter. 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.

3. 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 1/4-20 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.

> **⚠ WARNING**
>
> 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.

4. Mount the drill jig supplied with the strain links (see Figure 2-11 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).

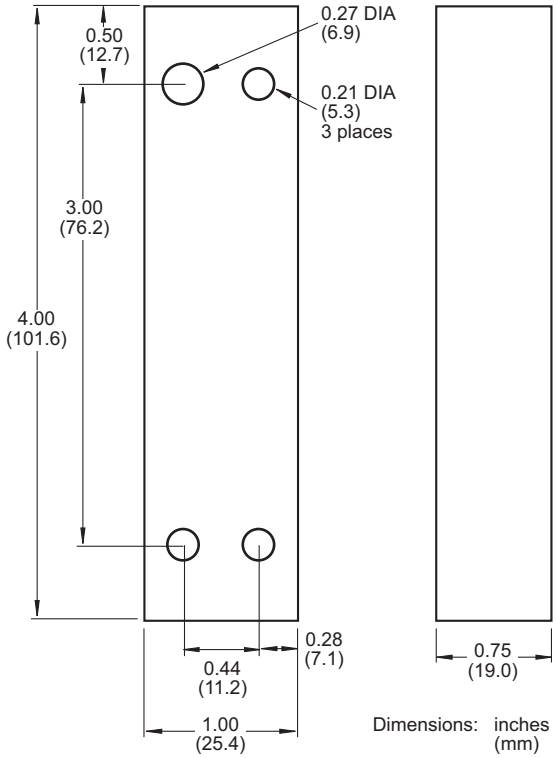


Figure 2-11. Strain Link Drill Jig: Mounting Dimensions

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.

5. 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. For metric strain links, drill 12-mm-deep holes with a 5 mm drill bit.
6. Remove the drill jig, and tap the three holes. Bottom tap for a 1/4-20 thread. For metric strain links, tap with an M6X1 thread.
7. Mount the strain link loosely on the press, using the four short mounting screws.

NOTICE

STRAIN LINKS SHOULD BE MOUNTED LOOSELY
Do not tighten the screws on the strain link. The strain link is tightened down during the strain link zeroing procedure (see *Zeroing Strain Links*, page 3-1).

8. Repeat steps 3 through 7 for the remaining strain links.
9. Tag each strain link cable to identify its position on the press.
   - For 2-channel AutoSets, 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 the bottom right knockout on the control enclosure or to the appropriate location on your console. AutoSet enclosures are rated NEMA 12 (i.e., protected against dust and oil). You must use conduit of the same rating and make proper connections to ensure NEMA 12 protection.

NOTICE

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

2. Measure cable to length, making sure each cable reaches the appropriate connector on the AutoSet processor board (see Table 2-3) and allowing for a service loop inside the enclosure; then, cut the cable.

Table 2-3. Strain Link Connections on AutoSet Processor Board

Terminal Block Connector	Strain Link Connections: AutoSet 1500	Strain Link Connections: AutoSet 1504
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 2-3.

> **CAUTION**
>
> **INCORRECT WIRING CAN DAMAGE STRAIN LINKS**
>
> Make sure to connect the black and red wires to the correct terminals as shown in Table 2-4 or Table 2-5. 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 2-4 or Table 2-5. If you mounted the strain links to read tension, refer to Table 2-4. If you mounted the strain links to read compression, refer to Table 2-5. 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 2-12, page 2-16.
6. When you have finished wiring the connector, plug it back into the terminal block from which you removed it. The connector plugs in only one way. Double-check connections.
7. Wire the remaining strain link cables, repeating steps 4 through 6.

Table 2-4. 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 2-5. 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.

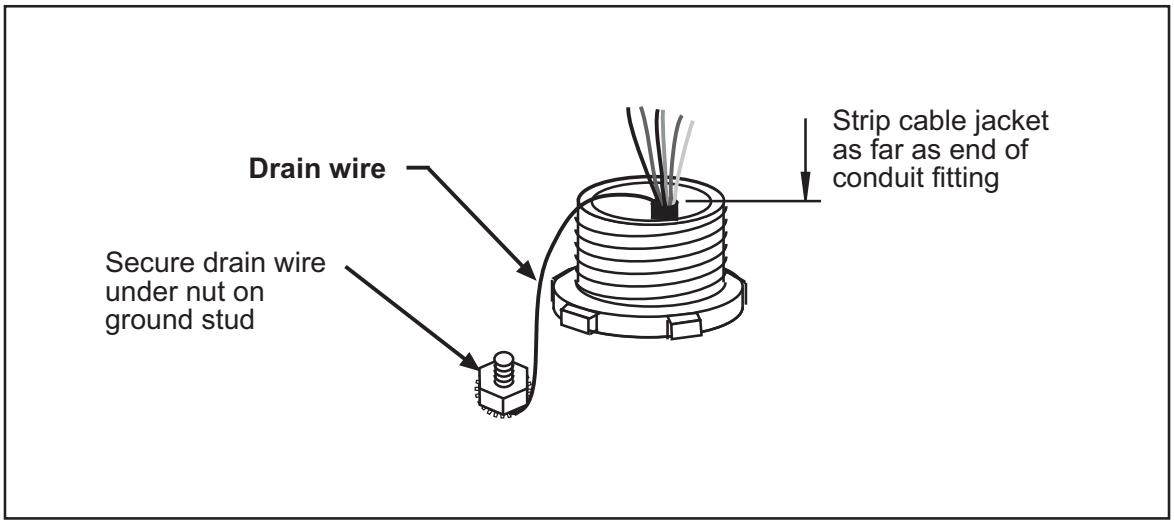


Figure 2-12. Shield Drain Wire Connected to Ground Stud on Enclosure

Installing a Zero Cam

A "zero cam" is a cam switch that sends a signal to AutoSet 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 AutoSet from registering any tonnage events within the zero cam window. The zero cam ensures that AutoSet 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 AutoSet 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.

A zero cam is recommended for standard AutoSet 1500 and 1504 load analyzers and is required for AutoSet 1500 Plus and 1504 Plus units. A latching magnetic cam switch (LMCS) to provide the zero signal is available from Wintriss.

Using a Zero Cam on Standard AutoSets

A zero cam is recommended for standard AutoSet load analyzers and is required in the following cases:

- When your press operates at speeds greater than 400 strokes per minute. AutoSet cannot zero itself at these speeds.
- When presses that operate at speeds slower than 400 strokes per minute run jobs at tonnages less than 5% of press capacity. AutoSet cannot detect tonnages beneath the 5% threshold and, therefore, cannot reset itself when tonnages are lower than 5%.
- When presses generate tonnage readings greater than 5% at the beginning or end of a stroke. For example, some presses when running in Single-stroke mode produce tonnages greater than 5% when they complete their stroke at Top Stop. When AutoSet detects these

additional tonnage "blips," it replaces the tonnage reading of interest, which occurs near the bottom of the stroke, with these false readings.

A zero cam is strongly recommended for presses that, when running in Continuous mode, generate abnormally high or low tonnages near the top of the stroke during the first few strokes after startup. These tonnage "incidents," which are produced by vibrations (also called "ringing") or start-up torque, generate inaccurate tonnage measurements and are capable of corrupting the tonnage samples AutoSet uses to calculate setpoints.

Using a Zero Cam on AutoSet Plus Units

Some tonnage monitors can zero themselves without any external signal if they are monitoring high setpoints only. Repeatability, or stroke-to-stroke, monitoring requires an external input from a zero cam. The zero signal can be supplied by a latching magnetic cam switch (LMCS), Candy switch, proximity sensor, or an electronic limit switch.

Wintriss provides a latching magnetic cam switch (LMCS) with AutoSet Plus. The following steps explain how to install the LMCS and magnets.

Installing the Latching Magnetic Cam Switch (LMCS)

The Latching Magnetic Cam Switch (LMCS) available from Wintriss consists of the following parts:

- A sensor mounted on a bracket with wiring for connection to the AutoSet processor board
- A red magnet to attach to the crankshaft or other rotating member at 240° of press rotation
- A blue magnet to mount at 30° of press rotation
- Two brass screws, one for mounting each magnet

To install the LMCS, do the following:

1. Select a mounting site that allows the magnets to rotate one-to-one with the press crankshaft. The ideal mounting location is the crankshaft itself. Alternative sites are the pitman above the adjusting screw or a drive shaft to a feed or other device.
2. Mount the two magnets as shown in Figure 2-13, page 2-18.

   Position the red magnet so it closes the cam switch at an angle of 240°. Locate the blue magnet so it opens the cam switch at an angle of 30°. There should be a dwell of 150° between the two magnets across the top of the stroke. The LMCS should be open while the part is being formed.

   Magnets should be installed plastic side up with a non-ferrous metal screw. A ferrous screw may cause false signals. A brass screw (6-32) is supplied with each magnet. Use a No. 36 drill and a 6-32 tap.

> **NOTICE**
>
> For high-speed presses, Wintriss recommends that you use a brass screw, not epoxy or nylon. If the epoxy does not hold or if the nylon screw breaks, the magnets can become dangerous projectiles.

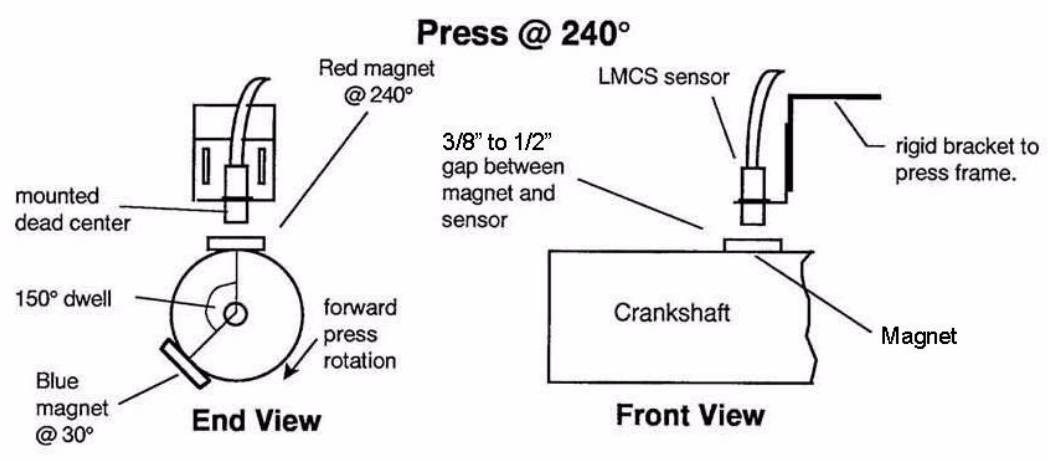


Figure 2-13. LMCS Installation

NOTICE

Make sure to position the LMCS sensor at least 3/8 in. away from the magnet. If the sensor/magnet gap is too small, the sensor will actuate two times per stroke, causing zero tonnage displays and, potentially, repeatability faults.

3. Mount the LMCS sensor on an adjustable bracket so the sensor is positioned 3/8" to 1/2" from the face of both magnets (see Figure 2-13). The LMCS sensor is shipped mounted on a slotted bracket with slots 1.5" apart and approximately .1875" (3/16") wide by .75" (3/4") long. Use size 6-32 hardware and lock washers.
4. Open the cover of the AutoSet enclosure, and locate terminal block TB101B (AutoSet 1500 and 1500 Plus) or TB101A (AutoSet 1504 and 1504 Plus) at the lower left of the AutoSet processor board, referring to Figure 2-4 or Figure 2-5.
5. Run the cable from the LMCS sensor through flexible, liquid-tight conduit to the bottom left knockout on the AutoSet enclosure or to the appropriate location on your console. Measure and cut the cable so it reaches TB101B or TB101A easily.

   The AutoSet enclosure is rated NEMA 12 (protected against dust and oil). If you ordered the enclosure, you must use conduit rated NEMA 12 and make proper conduit connections to ensure NEMA 12 protection.
6. Remove the connector from the TB101B or TB101A terminal block, and connect the three wires from the LMCS sensor cable, as shown in Table 2-6, page 2-19.

   Refer to Figure 2-7, page 2-9 if you need help connecting the wires to the terminals. Make sure not to wire the connector backwards.

Table 2-6. LMCS (Zero Cam) Wiring Connections, TB101B or TB101A

AutoSet Model	Terminal Block	Pin #	Label	Wire Color
1500 or 1500 Plus	TB101B	2	Zero Cam	White or clear
		4	+12Vdc	Red
		5	Ground	Black
1504 or 1504 Plus	TB101A	2	Zero Cam	White or clear
		4	+12Vdc	Red
		10	Ground	Black

NOTICE

WIRING FOR DEVICES OTHER THAN LMCS

Mechanical switches and programmable limit switches (PLS) do not require power connections, so you will not need to make connections to pin 4 (+12 VDC). If your switch does need power, however, make sure to wire the switch to pin 4 (+12 VDC) and either pin 5 (AutoSet 1500/1500 Plus) or pin 10 (1504/1504 Plus), which provides the Ground connection.

NOTICE

The LMCS has no separate ground connection for the zero signal. The ground for power and the ground for the signal are the same. Other switches requiring power may have identical power and signal ground connections. Check the instructions for your switch.

7. Plug the connector back into the TB101B or TB101A terminal block. The connector can be plugged in only one way. Check the wiring connections to make sure they are correct.

NOTICE

If you have an AutoSet 1500 Plus or 1504 Plus, the Zero Cam feature is always enabled. You do not have to set Mode switch #2 (see step 8).

8. If you have a standard 1500 or 1504 AutoSet, locate the Mode switch block (S101) just to the right of the ribbon cable connector on the left side of the AutoSet processor board (see Figure 2-14, page 2-20).

   Using a ballpoint pen or small screwdriver, move switch #2 to the ON, or right, position. When switch #2 is set to ON, Zero Cam is enabled on standard AutoSet units. The Zero Cam feature is always enabled on AutoSet Plus load analyzers.

9. After you have connected AutoSet to a power source (see next section), turn the unit on and, referring to the Zero Cam LED on the AutoSet front panel, check to make sure that the zero signal comes on at approximately 240° and turns off at 30°. The zero signal is on when the Zero Cam LED is illuminated.

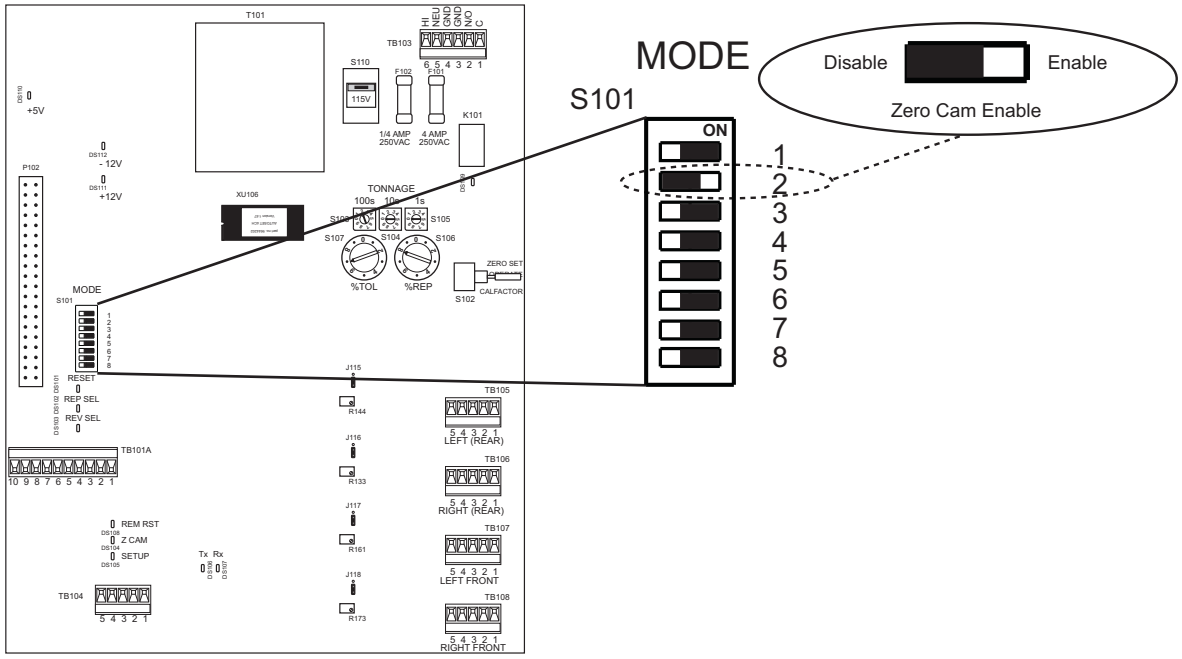


Figure 2-14. AutoSet 1504 Processor Board: Mode Switch #2 Set to ON (Zero Cam Enabled)

Optional Wiring Connections

The following sections show you how to make wiring connections for these optional items:

- Remote reset switch
- Oscilloscope
- Setup mode circuit (AutoSet Plus only)

Wiring a Remote Reset Switch

A remote reset switch allows you to reset the AutoSet load analyzer when you are away from the unit without using the RESET button (standard AutoSet) or DISPLAY switch (AutoSet Plus) on the AutoSet front panel. A simple, normally open, momentary push-button switch can be used. To wire a remote reset switch, do the following:

NOTICE

The RESET button (standard AutoSet) or DISPLAY switch (AutoSet Plus) on the AutoSet front panel is still functional when a remote reset switch is connected.

1. Select a location for the switch and connect wires of the appropriate length to it.
2. Open the cover of the AutoSet enclosure, and locate terminal block TB101B (AutoSet 1500 and 1500 Plus) or TB101A (AutoSet 1504 or 1504 Plus) at the lower left of the AutoSet processor board, referring to Figure 2-4 or Figure 2-5.

3. Run wiring from the remote reset switch through flexible, liquid-tight conduit to the bottom left knockout on the AutoSet enclosure or to the appropriate location on your console. Measure and cut the cable so it reaches TB101B or TB101A easily.

   The AutoSet control enclosure is rated NEMA 12 (protected against dust and oil). If you ordered the enclosure, you must use conduit rated NEMA 12 and make proper conduit connections to ensure NEMA 12 protection.

4. Remove the connector from the TB101B or TB101A terminal block, and connect the wires from the remote reset switch to the Remote Reset and Ground terminals as shown in Table 2-7.

   Refer to Figure 2-7, page 2-9 if you need help connecting the wires to the terminals. Make sure not to wire the connector backwards.

Table 2-7. Remote Reset Switch Wiring Connections, TB101B or TB101A

AutoSet Model	Terminal Block	Pin #	Label
1500 or 1500 Plus	TB101B	1	Remote Reset
		5	Ground
1504 or 1504 Plus	TB101A	1	Remote Reset
		10	Ground

5. Plug the connector back into the TB101B or TB101A terminal block. The connector can be plugged in only one way. Check the wiring connections to make sure they are correct.

Wiring an Oscilloscope

You can connect an oscilloscope to the AutoSet load analyzer to view or plot tonnage waveforms produced at each strain link. The AutoSet 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 1504+ 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. Open the cover of the AutoSet enclosure, and locate terminal block TB101B (AutoSet 1500 and 1500 Plus) or TB101A (AutoSet 1504 or 1504 Plus) at the lower left of the AutoSet processor board, referring to Figure 2-4 or Figure 2-5.

2. Run wiring from the oscilloscope through flexible, liquid-tight conduit to the bottom left knockout on the AutoSet enclosure or to the appropriate location on your console. Measure and cut the cable so it reaches TB101B or TB101A easily.

   The AutoSet control enclosure is rated NEMA 12 (protected against dust and oil). If you ordered the enclosure, you must use conduit rated NEMA 12 and make proper conduit connections to ensure NEMA 12 protection.

3. Remove the connector from the TB101B or TB101A terminal block, and connect wiring for the oscilloscope as shown in Table 2-8. On Auto Set 1500 and 1500 Plus models you connect three wires, one for each of the two strain links and one for ground. On AutoSet 1504 and 1504 Plus units, you connect five wires, one for each of the four strain links and one for ground.

   Refer to Figure 2-7, page 2-9 if you need help connecting the wires to the terminals. Make sure not to wire the connector backwards.

Table 2-8. Oscilloscope Wiring Connections, TB101B or TB101A

AutoSet Model	Terminal Block	Pin #	Label
1500 or 1500 Plus	TB101B	5	Ground
		6	Channel 1 (Left Rear)
		7	Channel 2 (Right Rear)
1504 or 1504 Plus	TB101A	6	Channel 1 (Left Rear)
		7	Channel 2 (Right Rear)
		8	Channel 3 (Left Front)
		9	Channel 4 (Right Front)
		10	Ground

4. Plug the connector back into the TB101B or TB101A terminal block. The connector can be plugged in only one way. Check the wiring connections to make sure they are correct.
5. Connect the wires from TB101B or TB101A to the oscilloscope, following the manufacturer's instructions for your specific oscilloscope.

Wiring a Setup Mode Circuit (AutoSet Plus Only)

The Setup Mode function, which disables repeatability monitoring when the press is set to Inch mode, is available only on AutoSet Plus. Typically the Setup Mode circuit is connected to the "Inch" position of your clutch/brake control. When you run the press in Inch mode, AutoSet Plus does not generate a repeatability fault and stop the press.

To wire a Setup Mode circuit, do the following:

1. Open the cover of the AutoSet enclosure, and locate terminal block TB101B (AutoSet 1500 Plus) or TB101A (AutoSet 1504 Plus) at the lower left of the AutoSet processor board, referring to Figure 2-4 or Figure 2-5.
2. Run wiring from the "Inch" circuit of your press control or other device through flexible, liquid-tight conduit to the bottom left knockout on the AutoSet enclosure or to the appropriate location on your console. Measure and cut the cable so it reaches TB101B or TB101A easily.
3. Remove the connector from the TB101B or TB101A terminal block, and connect wiring from the Inch circuit of your press control as shown in Table 2-9, page 2-23. You connect two wires.

Refer to Figure 2-7, page 2-9 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 TB101A terminal block. The connector can be plugged in only one way. Check the wiring connections to make sure they are correct.

Table 2-9. Setup Mode Circuit Wiring Connections, TB101B or TB101A

AutoSet Model	Terminal Block	Pin #	Label
1500 Plus	TB101B	8	Setup
		10	Ground
1504 Plus	TB101A	5	Setup
		10	Ground

NOTICE

Make sure that the Setup Mode circuit is connected so the Setup Mode input is pulled to ground when the press control is set to “Inch” and is open when not in “Inch.” Refer to your electrical prints or the manual for your press control to plan your wiring.

5. Make sure that switch 5 on Mode switch block S101 on the AutoSet Processor board is set to the OFF position, its default setting. This position enables Setup Mode. (To disable Setup Mode, move the switch to its ON position.)

Connecting an AutoSet to SmartPAC

The following sections show you how to connect an AutoSet to either SmartPAC 2 or the original SmartPAC. Up to two AutoSets can be connected to a single SmartPAC.

NOTICE

If your AutoSet firmware version is 2.27 or higher, you do NOT need to replace the firmware chip when connecting the AutoSet to a SmartPAC control. You must, however, do the following on the AutoSet board:

- Set all Tonnage indicator dials to zero
- Set the Zero Set/Operate/Calfactor toggle switch (S102) to “OPERATE”

Connecting an AutoSet to SmartPAC 2

To connect an AutoSet to a SmartPAC 2 control, perform the following steps, referring to your SmartPAC 2 user manual for help:

1. Locate terminal block TB103 on the SmartPAC 2 processor board and terminal block TB104 on the AutoSet 1500 (see Figure 2-4) or 1504 (see Figure 2-5) processor board.
2. Run the five-conductor shielded communications cable through flexible, liquid-tight, low-voltage conduit from SmartPAC 2 to AutoSet. If you have SmartPAC 2 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 2 enclosure and through the bottom left knockout on the AutoSet enclosure.

3. Make communications wiring connections as shown in Table 2-10,

Table 2-10. Communications Wiring Connections: AutoSet and SmartPAC 2

AutoSet TB104 Pin # *	SmartPAC 2 TB103 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 2-12).

4. Verify that switch 6 on Mode switch block S101 on the AutoSet processor board is set to the OFF position, its default setting, as shown in Figure 2-15.

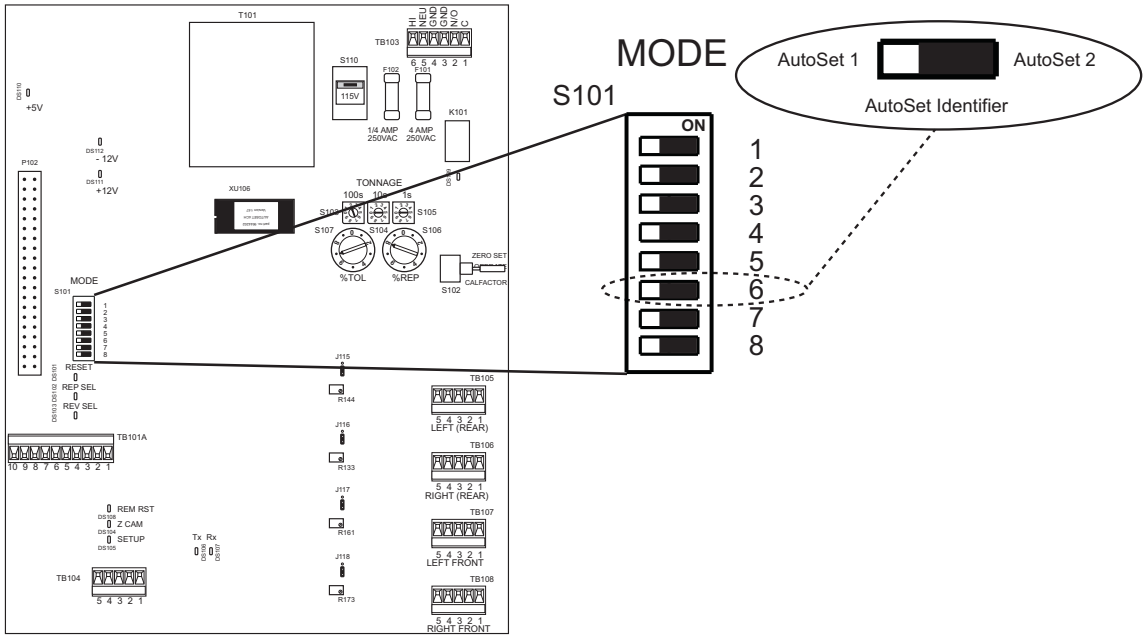


Figure 2-15. AutoSet 1504 Processor Board: Mode Switch #6 Set to OFF (AutoSet 1)

When two AutoSets are connected to a single SmartPAC, Mode switch 6 can be set so that SmartPAC recognizes which AutoSet it is communicating with. Mode switch 6 would be set to OFF on one AutoSet, identifying that unit as AutoSet 1, and set to ON on the other AutoSet, identifying it as AutoSet 2.

5. 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.

   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 2 zero cam output (pin #248 on terminal block TB107 on the SmartPAC 2 processor board) to the AutoSet zero cam input (pin #2 on TB101A or TB101B on the AutoSet processor board). Also, connect a ground wire from pin #250 on TB107 to pin #10 on TB101A or pin #5 on TB101B. You can run the zero cam wiring through the same conduit as the communications wiring used in step 2.
7. Power up SmartPAC 2.
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, referring to your SmartPAC 2 user manual for assistance.
13. Return the old AutoSet firmware chip to Wintriss.

Connecting an AutoSet to SmartPAC 1

To connect an AutoSet to a SmartPAC 1 control, perform the following steps, referring to your SmartPAC user manual for help:

1. Access the List of Installed Options screen on the Main Initialization Menu, 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, 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. Power down SmartPAC.
4. Replace SmartPAC firmware, if necessary, referring to the SmartPAC manual for help. (If you have a panel mount, do not replace the firmware or character generator until step 6.)
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 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. If you have a panel mount version of SmartPAC, follow these steps to replace the firmware and/or character generator:
   a. Remove the SmartPAC panel mount from the panel.
   b. Label all wiring connectors with their locations and disconnect them from the SmartPAC processor board.
   c. Remove the SmartPAC firmware board and, if they are installed, the DiProPAC and/or ProCamPAC boards (refer to the drawing in your SmartPAC manual).
   d. Disconnect the multi-colored ribbon cable and the brown 3-conductor plug located at the right edge of the SmartPAC processor board.

      To remove the ribbon cable, push the tabs at both ends of the connector outward simultaneously.

      To remove the brown connector, squeeze the outer tabs.
   e. Remove the top board by removing the 3 nuts on the edge and the 6 spacer nuts.
   f. Replace the character generator firmware, if necessary, as described in step 5 above.
   g. Replace the components you removed above.
      - Plug in the brown connector.
      - Reinstall the ribbon cable connector by pushing it into its socket until the outer tabs click inwards.
      - Reinstall the DiProPAC and ProCamPAC boards, if necessary.
      - Reinstall the old SmartPAC firmware board, or install a new board (see step 4).
      - Reinstall the wiring connectors in the locations you labelled in step 6b.
      - Reinstall the SmartPAC panel mount in your console.
7. 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.

   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.

8. Run a communications cable between the AutoSet and SmartPAC and wire both ends to the appropriate connector, repeating steps 1 through 4 of the *Connecting an AutoSet to SmartPAC 2* procedure, page 2-23. Refer to Table 2-11 for wiring connections.

Table 2-11. Communications Wiring Connections: AutoSet and SmartPAC

AutoSet TB104 Pin # *	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 2-12).

9. 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 TB101A 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 8.
10. Power up SmartPAC.
11. 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, referring to your SmartPAC user manual, if necessary.
12. Select TONNAGE MONITOR on the Main Initialization Menu to display the Tonnage Monitor Initialization Menu.
13. 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.
14. 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.
15. Select SECURITY ACCESS on the Tonnage Monitor Initialization Menu, and configure AutoSet security the way you want it.
16. 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, referring to your SmartPAC user manual for assistance.
17. Return the obsolete SmartPAC firmware board and the old AutoSet firmware chip to Wintriss.

Connecting AC Wires to Power Source

Connect AC wires from the AutoSet control to your AC power source only when you are finished connecting all wiring inside the control enclosure, including wiring for the zero cam switch and any optional wiring connections.

> **⚠ WARNING**
>
> **ELECTRIC SHOCK HAZARD**
>
> Make sure main power is off when you connect AutoSet to the main power source.
>
> **Failure to comply with these instructions could result in death or serious injury.**

Powering Up AutoSet

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

1. Open the cover of the AutoSet enclosure and locate the switch labelled S102 at the right of the AutoSet processor board just above the strain link connectors (see Figure 2-4 or Figure 2-5).
2. Move the switch to the "ZERO SET" position, close the cover, and turn power on.

   The Load LED displays should show 0's or other numbers. The Setpoints displays should show either numbers, dashes (- - -), or the letters "HI," "LO," or "rEP."
3. If the displays are not active, turn off power to the AutoSet. Re-check connections for power and strain links. Make sure that the voltage selector switch is set correctly (either 115V or 230V) and that switch S102 is set to "ZERO SET." Then turn power on again and check the displays. If the displays are still inactive, call Wintriss Tech. Support.

Once you have made all connections and AutoSet has power, you are ready to calibrate your AutoSet. See Chapter 3.

Chapter 3. Calibration

This chapter shows you how to calibrate an AutoSet 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*, below.
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 3-5. You can use your own calibration gear, or rent an AutoSet 1500 calibration kit from Wintriss.
3. Determine the tonnage capacity of your press, and set the full-scale tonnage of your AutoSet to that value, following the instructions in *Setting Full-scale Tonnage on Your AutoSet*, page 3-12.
4. Adjust your AutoSet until its Load displays agree with the tonnage recorded on your calibration unit, following the instructions in *Adjusting AutoSet to Read the Correct Tonnage*, page 3-15.

AutoSet 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 AutoSet processor board as described in *Installing Strain Links*, page 2-10. 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 the AutoSet.

> **NOTICE**
>
> Switch S102 should already have been set to "ZERO SET" during the power-up check. See *Powering Up AutoSet*, page 2-28.

3. Move the switch labelled S102 on the AutoSet processor board to the "ZERO SET" position if S102 is not already at this setting (see Figure 2-4, or Figure 2-5 for location). Check the Load and Setpoints LED displays on the AutoSet front panel.

NOTICE

When a Load LED display on the AutoSet front panel shows a value between +50 and -50, the corresponding Setpoints LED display shows dashes (---). When a Load LED display shows a value greater than +50, the corresponding Setpoints LED display shows the message “HI.” When a Load display is greater than -50, that Setpoints LED display shows the message “LO.”

If the strain link zero offset reading is greater than ±99, the corresponding Load LED display shows, in flashing letters, the message “HI” (if >+99) or “LO” (if >-99), and the Setpoints LED display shows the message “Err.” All other Load and Setpoints LED displays are blank. If multiple strain links have zero offsets outside the ±99 window, only the displays for one strain link show the “HI”/“LO” and “Err” messages, the other displays remaining blank.

4. If one of the strain links is generating a blinking “HI” or “LO” message on the Load LED display and an “Err” message on the Setpoints LED display, select that strain link to adjust first. Otherwise, select any strain link.
5. 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 3-1.

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.

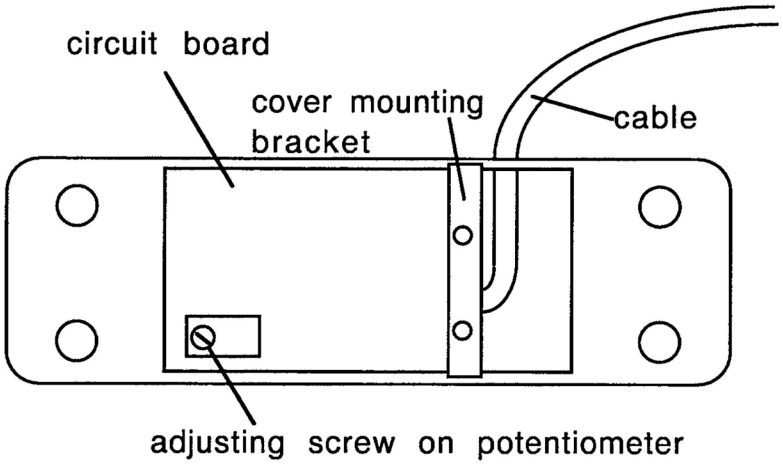


Figure 3-1. Potentiometer Adjustment Screw on Strain Links without Access Hole in Cover

6. Check the offset value for the strain link you are zeroing, referring to the Load LED display on the AutoSet front cover. If the offset value is greater than ±5, perform step 7. Otherwise, go to step 8.

NOTICE

If the zero adjustment reading is greater than ±99, the message “HI” or “LO” will flash on the Load LED display for that strain link until you have adjusted the reading to less than ±99 and reset the unit with the RESET button or DISPLAY switch, at which time the Load LED display will show the offset to which you have adjusted the strain link. The Setpoints LED display for the strain link will show the message “Err” until the zero adjustment reading has been brought within the ±99 window and the unit has been reset, at which time the Setpoints display will change to either “HI” or “LO.” The Setpoints display will change to dashes (---) when the zero adjustment reading has been brought within ±50.

7. Turn the potentiometer adjustment screw clockwise or counterclockwise, as shown in Table 3-1, below, until the Load display for that channel reads between +5 and -5. Try to adjust the tonnage reading as close to zero as possible.

Table 3-1. Strain Link Potentiometer: Direction of Screw Adjustment*

Tonnage Display	Setpoints Display	Potentiometer Adjustment: Tension †	Potentiometer Adjustment: Compression ‡
Positive number or HI	---, HI, or Err	Turn counterclockwise	Turn clockwise
Negative number or LO	---, LO, or Err	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 2-9, page 2-11 and Figure 2-10, page 2-12)

‡ Strain links measure compression when mounted on the rear of gap-frame (OBI or OBG) presses (see Figure 2-9, page 2-11)

NOTICE

If you cannot use the LED displays on the AutoSet front panel to zero the strain links (i.e., displays are too far away or are obstructed), perform the *Using a Voltmeter to Zero Strain Links* procedure, page 3-4.

NOTICE

If you cannot get the Load 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.

8. 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.

9. Tighten the screws evenly around the perimeter of the strain link to a specification of 150 in./lbs.
10. Check the strain link's offset value on the Load LED display on the AutoSet front panel.
11. Using the potentiometer adjustment screw (refer to Table 3-1), adjust the strain link offset until it falls between +50 and -50. Try to adjust the offset as close to zero as possible.
12. If you cannot adjust the strain link's offset reading to within the ±50 window, loosen the mounting screws and repeat steps 9 through 11.

> **NOTICE**
>
> If after several attempts you cannot get the Load 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.

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

> **NOTICE**
>
> When multiple strain links have zero adjustment readings outside the ±99 window, the Load and Setpoints displays for only one strain link will show the "HI"/"LO" and "Err" messages, the LED displays for the other strain links remaining blank. When that strain link has been adjusted to a value within ±99, the Load and Setpoints displays for one of the remaining out-of-range strain links will show the "HI"/"LO" and "Err" readings.

14. Zero the remaining strain links, repeating steps 4 through 13. Start with any strain link that is generating a blinking "HI" or "LO" message on a Load LED display and an "Err" message on the corresponding Setpoints LED display. When no strain link is generating a flashing "HI" or "LO" message, proceed with zeroing the strain links that remain.
15. When all the strain links have been zeroed, turn the S102 switch on the AutoSet processor board to the "OPERATE" position (see step 3).

Using a Voltmeter to Zero Strain Links

Perform the following procedure if the AutoSet LED displays cannot be used to zero strain links (i.e., displays are too far away or are obstructed).

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

> **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 Load display. If it reads between +50 and -50, you are finished.
4. If the Load 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 1500 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 an hydraulic jack for calibration. An 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 1500 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 3-2, page 3-6 or Figure 3-3, page 3-7 for location of components on old- and new-style processor boards. If your AutoSet calibration kit has the current version 2.0 processor board installed, refer to Figure 2-4, page 2-6 for component locations.

1. Open the cover of the AutoSet 1500 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 one way only. 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.

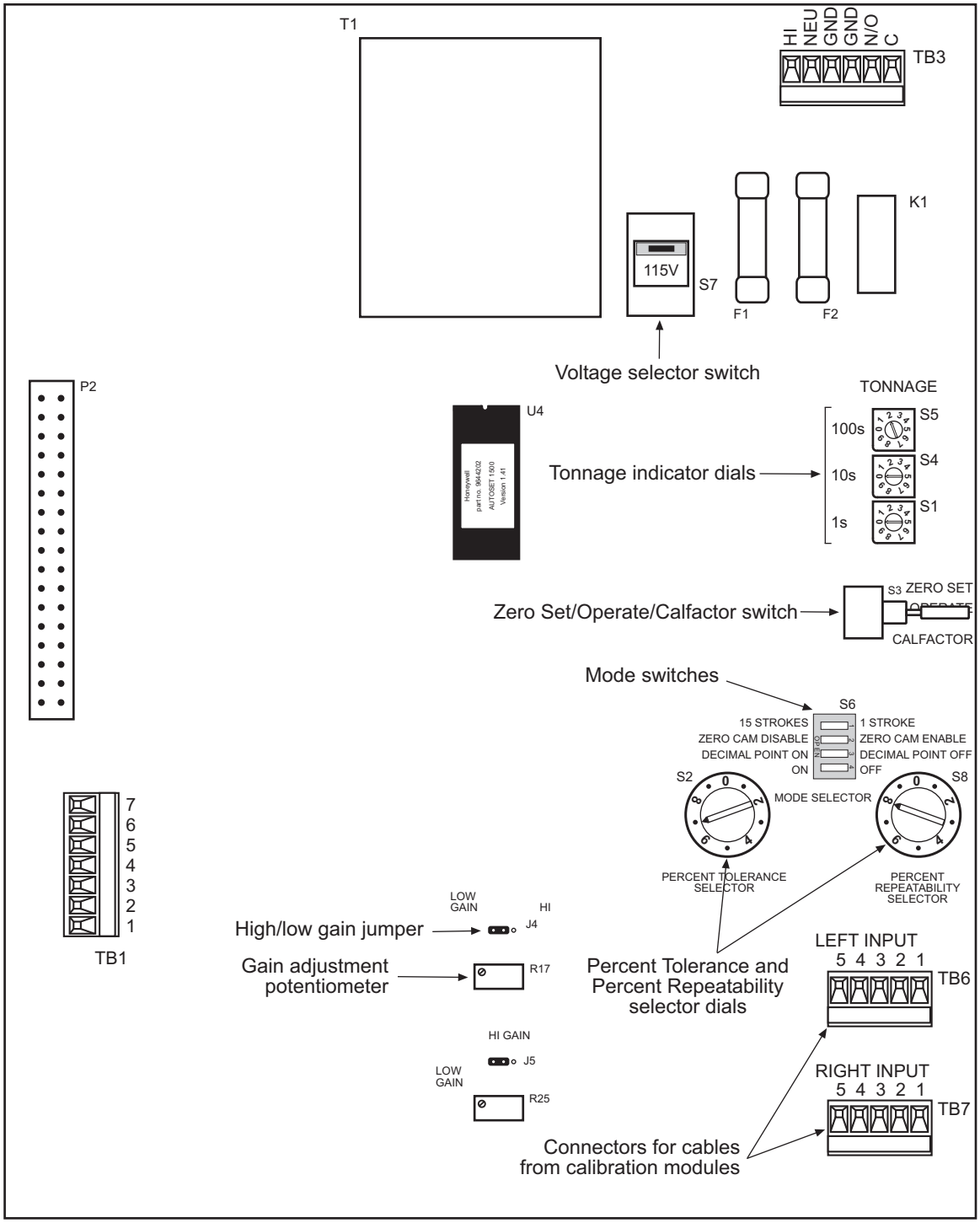


Figure 3-2. AutoSet 1500 Calibration Kit Processor Board: Old Style

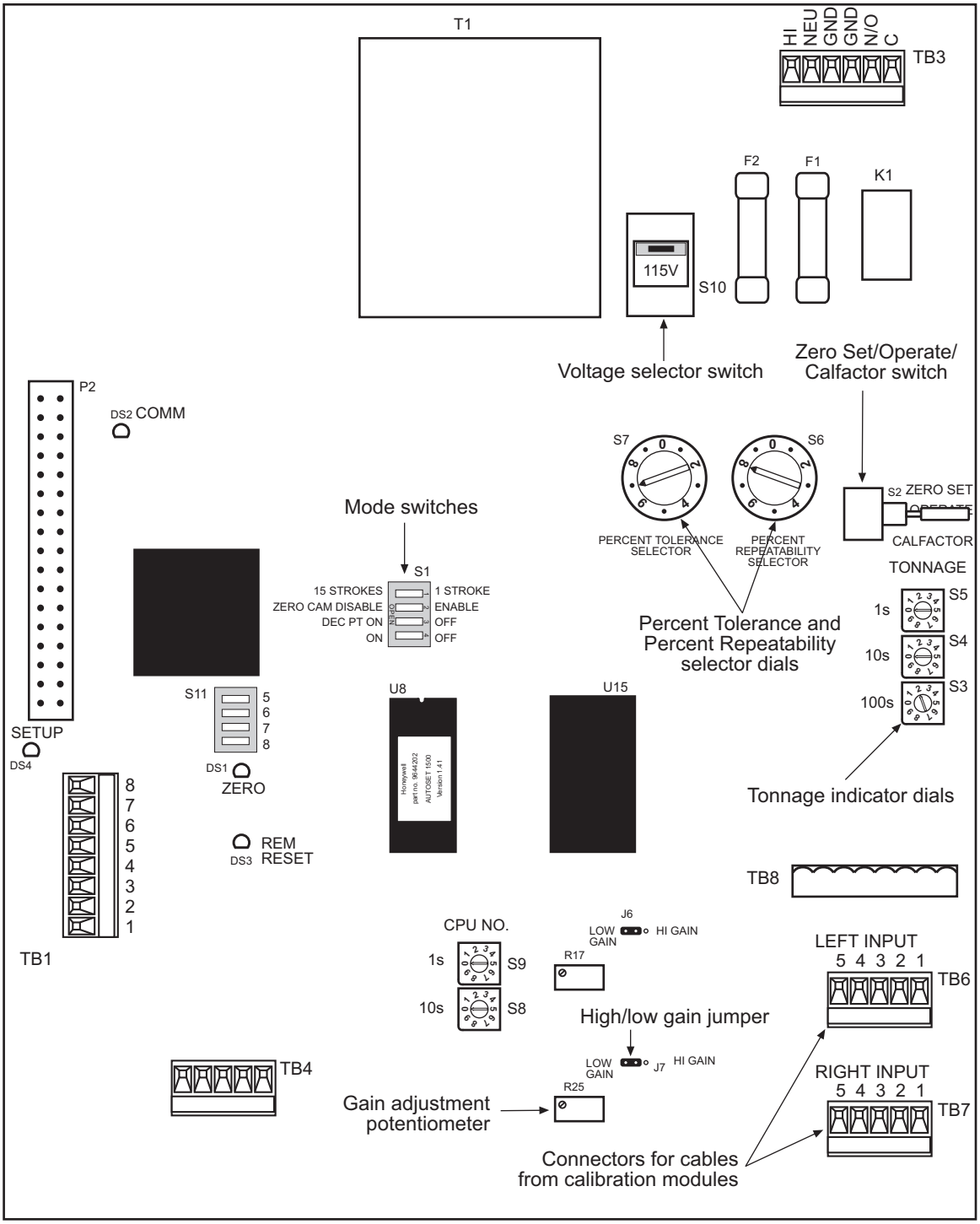


Figure 3-3. AutoSet 1500 Calibration Kit Processor Board: New Style

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 end of each load cell cable into the connector on each of the load cells you are using. Screw the connector on the other end of the cable into the connector on the calibration module.

⚠ WARNING

ELECTRIC SHOCK HAZARD

If the AutoSet 1500 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 2-5 (note that the AC power terminal block is labelled "TB3" on calibration kit boards–see Figure 3-2 or Figure 3-3).
5. Check the AutoSet displays. The Load LED displays should show 0's or other numbers. The Setpoints 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 3-2, S10 in Figure 3-3) is set correctly (either 115V or 230V), and switch S3 (Figure 3-2) or S2 (Figure 3-3) 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 3-2, S3, S4, and S5 in Figure 3-3) on the right side of the AutoSet processor board.

   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 3-4, you would turn the “100s” indicator to “2,” and turn the “10s” and “1s” indicators to “0.”

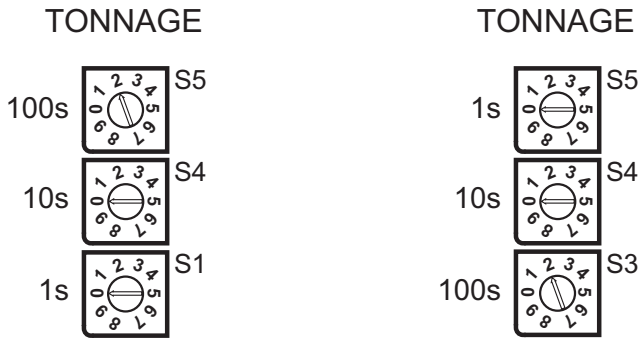


Figure 3-4. Tonnage Dial Indicators: Old-style Board (Left), New-style Board (Right)

8. Set the three 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 3-2, S1 in Figure 3-3). Figure 3-5 shows the Mode switch block on old-style AutoSet 1500 calibration kit processor boards. The switch block on new-style boards uses slightly different labels.

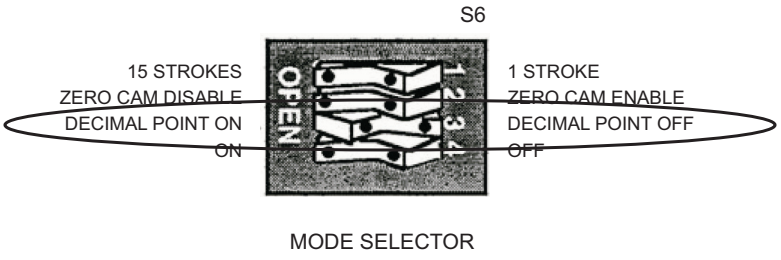


Figure 3-5. Mode Switch #3 Set to “Decimal Point Off” Position (Old-style Processor Board)

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 1500 tons. Table 3-2, page 3-10 summarizes your tonnage display options.

Table 3-2. 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)

9. Set Mode switch #3 for the display option you want, referring to Figure 3-5 and Table 3-2.
10. Power down the AutoSet calibration kit, then power it back up to reset the unit and activate your tonnage and decimal point settings.
11. Move the lever on the three-position switch labelled “S3” on old-style boards (see Figure 3-2) or “S2” on new-style boards (see Figure 3-3) 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 fall between +50 and -50. If you are using two load cells, the number in both left and right Load displays must fall in the ±50 range.

    If the Load displays are not within this range, there is a problem with your calibration unit. Call Wintriss Tech. Support for assistance.
12. Move the lever on switch S3 or S2 to the “CALFACTOR” position.
13. Locate the two load cell gain adjustment potentiometers labelled R17 and R25 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, as shown in Figure 3-6.

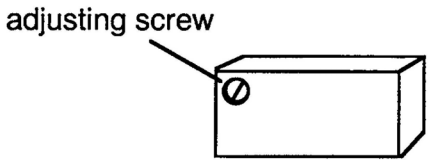


Figure 3-6. Load Cell Gain Adjustment Potentiometer with Adjustment Screw

14. 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 both channel displays 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.

15. 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.
16. Locate the Percent Tolerance Selector dial, labelled "S2" on old-style boards (see Figure 3-2) and "S7" on new-style boards (see Figure 3-3).

    Locate the Percent Repeatability Selector dial, labelled "S8" on old-style boards (see Figure 3-2) and "S6" on new-style boards (see Figure 3-3).

    Set both dials to the zero (0) position, then reset the unit by pressing the RESET button or turning the DISPLAY switch on the AutoSet cover to "RESET," making sure to release the button or switch immediately.

    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 1500 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 more evenly on the bed and ram. Even load distribution helps to improve calibration accuracy and linearity (see *Checking Linearity*, page 3-19).
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.

   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.

   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 AutoSet

> **NOTICE**
>
> Wintriss recommends that AutoSet 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 AutoSet to the full-scale tonnage of your press, which is currently being applied to the load cells connected to the calibration unit, do the following:

1. Open the cover of the AutoSet control enclosure, and locate the three dial indicators labelled "TONNAGE" (S103, S104, and S105) at the upper right of the AutoSet processor board (see Figure 3-7, page 3-13).

   Each dial indicator has an arrow you can turn, using a small screwdriver, to the numerical setting you want. Indicator S3 represents the hundreds position in the full-scale tonnage setting, indicator S4 represents the tens position, and indicator S5 represents the ones position. Dial indicators are factory-set to 200 tons, as illustrated in Figure 3-7, where indicator S103 is set to "2," and indicators S104 and S105 are set to "0."

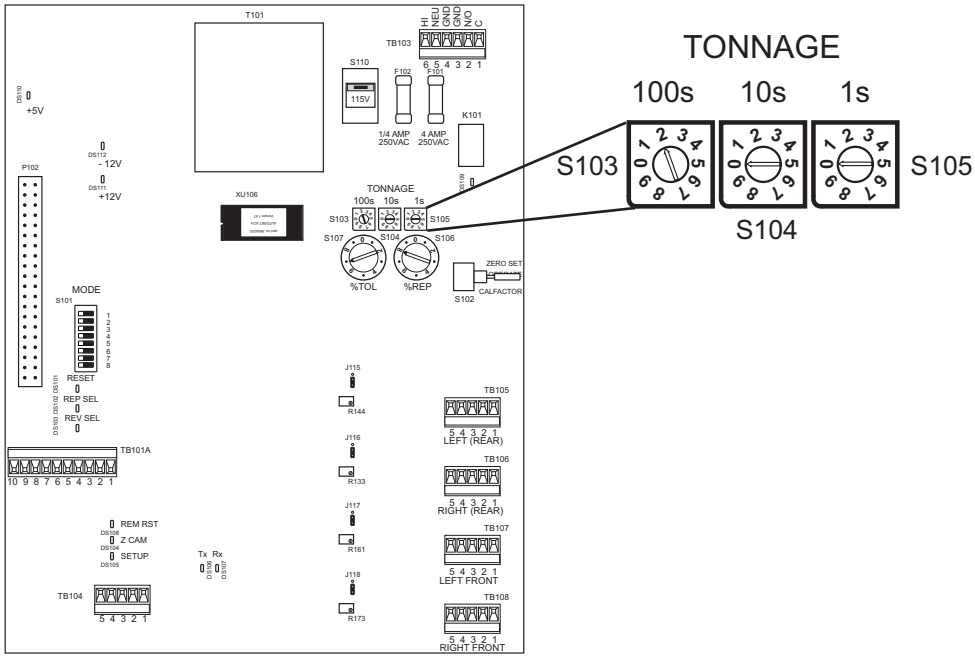


Figure 3-7. AutoSet 1504 Processor Board: Tonnage Dial Indicators

EXAMPLE

To set full-scale tonnage to 150 tons, turn the S103 dial to "1," turn the S104 dial to "5," and turn the S105 dial to "0." To set full-scale tonnage to 20 tons, turn the S103 dial to "0," the S104 dial to "2," and the S105 dial to "0."

2. Set the three dial indicators S103, S104, and S105 to the value you are using for the full-scale tonnage of your press. This is the tonnage currently displayed on your calibration unit (see step 8, page 3-12).

   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 Mode switch #3 on switch block S101 (see Figure 3-8, page 3-14).

   When switch #3 is in the OFF position, AutoSet LED displays include a decimal place. When switch #3 is in the ON position, no decimal point is shown. The decimal point is not active for full-scale tonnage settings between 201 and 1500 tons on AutoSet 1500 and 1500 Plus load analyzers or between 401 and 3000 tons on AutoSet 1504 and 1504 Plus units.

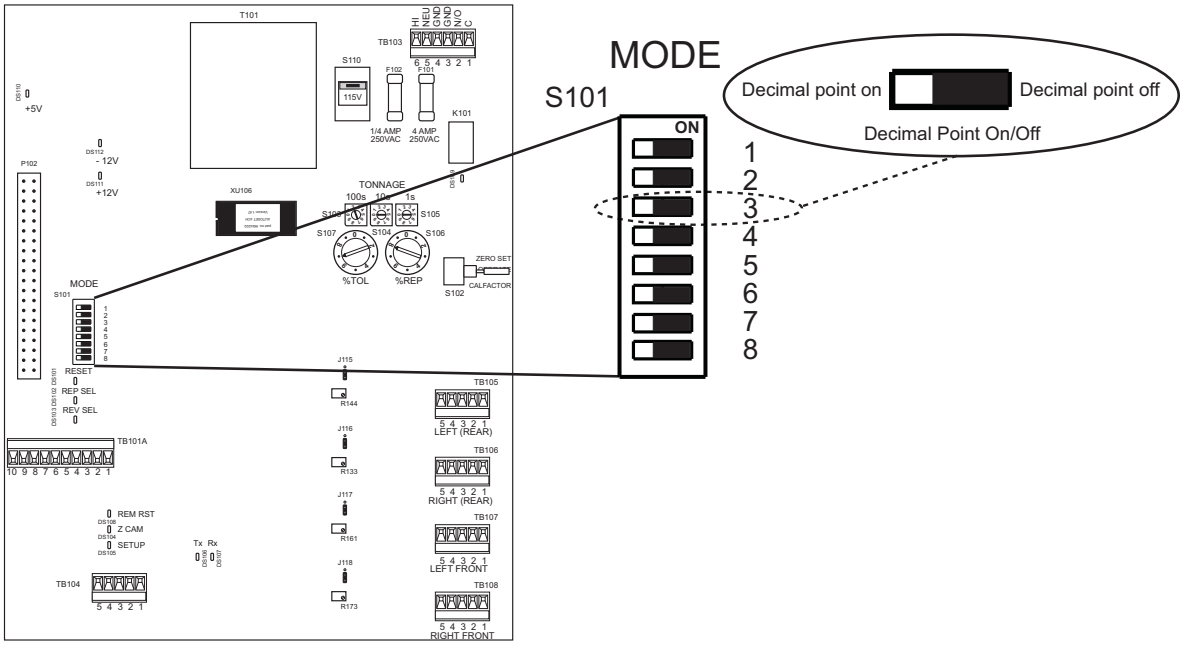


Figure 3-8. AutoSet 1504 Processor Board: Mode Switch #3 Set to OFF (Decimal Point On)

Table 3-3, below, and Table 3-4, page 3-15 summarize your tonnage display options on two-channel and four-channel AutoSets.

Table 3-3. AutoSet 1500 and 1500 Plus Tonnage Display Formats

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

* Displayed tonnage can be up to 120% of press capacity

Table 3-4. AutoSet 1504 and 1504 Plus Tonnage Display Formats

Load Cell Tonnage Range	Mode Switch #3 Setting	Decimal Point ON/OFF	Channel Load LED Display Format * †
400 tons or less	OFF	ON	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)
	ON	OFF	Whole tons (e.g., 6, 46, 100)
401 to 3000 tons	ON	OFF	Whole tons (e.g., 125, 400, 750)
More than 3010 tons	OFF	ON	Tenths of a ton (e.g., 5.5 = 55 tons, 25.0 = 250 tons, 99.9 = 999 tons)
	ON	OFF	Whole tons (e.g., 6 = 60 tons, 25 = 250 tons, 100 = 1000 tons)

* Displayed tonnage can be up to 120% of press capacity

3. Power down the AutoSet, then power the unit back up to reset the load analyzer and activate the settings made on the tonnage indicator dials and Mode switch #3.

Adjusting AutoSet to Read the Correct Tonnage

To adjust the tonnage displayed on your AutoSet load analyzer so it agrees with the value(s) shown on the calibration unit, perform the following steps:

> **NOTICE**
>
> Switch S102 should have been set to “OPERATE” at the end of the strain link zeroing procedure. See *Zeroing Strain Links*, page 3-4.

1. With the cover of the AutoSet enclosure open, move the lever on switch S102 at the upper right of the AutoSet processor board to the “OPERATE” position (see Figure 2-4 or Figure 2-5).
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 AutoSet processor board (see Figure 2-4 or Figure 2-5). Table 3-5, page 3-16 shows the processor board labels that identify potentiometers and jumpers for each AutoSet model.

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

AutoSet Model	Strain Link (Input Connector)	Gain Adjustment Potentiometer	High/Low Gain Jumper
1500	Left (TB105)	R144	J115
	Right (TB106)	R133	J116
1504	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 AutoSet match tonnage readings on the calibration unit. Potentiometers are adjusted by turning the small screw in the lower right corner of the component (see Figure 3-9, which shows the potentiometer and jumper for the Left (Rear) strain link input). The potentiometer screw has a 12-turn limit.

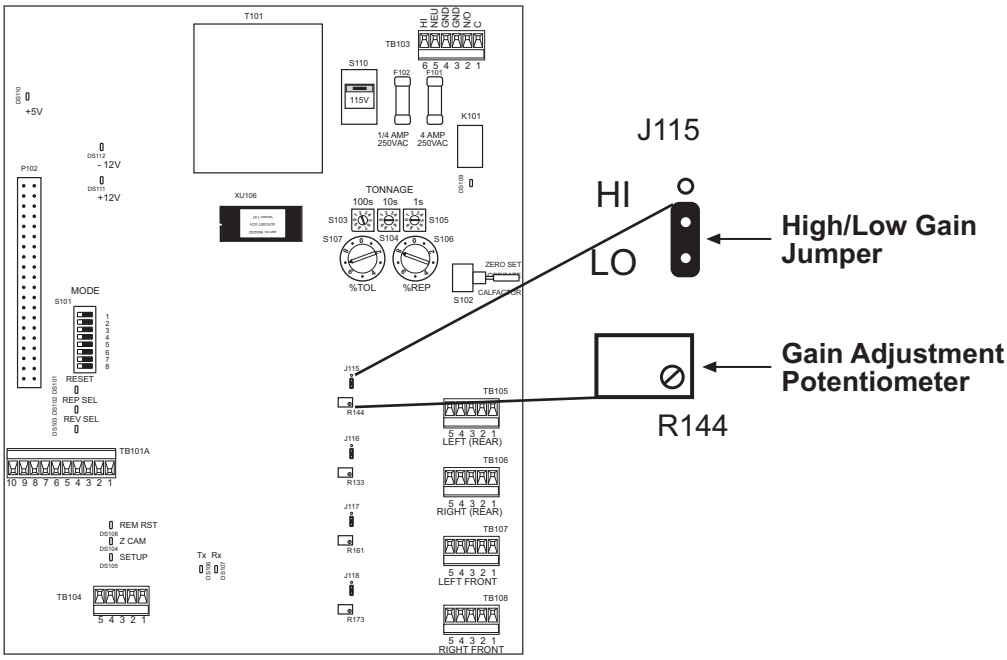


Figure 3-9. AutoSet 1504 Processor Board: High/Low Gain Jumper and Gain Potentiometer for Left Rear Strain Link

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 3-9). 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.

3. Cycle the press and compare the reading in the Left (AutoSet 1500) or Left Rear (AutoSet 1504) Load LED display with the tonnage displayed on the calibration unit.

In comparing tonnages, you must consider the number of load cells used during calibration and the number of strain link channels on your AutoSet. 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. AutoSet Load Readings: Ratio of Calibration Unit Readings

No. of Load Cells	No. of Active Displays on Cal. Unit	AutoSet 1500 Displays (2): Ratio of Cal. Unit	AutoSet 1504 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 AutoSet and on the calibration unit differ, turn the adjustment screw on gain potentiometer R144 clockwise to increase the tonnage reading for 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 Load display with a new value.

5. Continue cycling the press and adjusting potentiometer R144 until the tonnage shown in the “Left” (AutoSet 1500) or “Left (Rear)” (AutoSet 1504) Load LED display on your AutoSet matches the tonnage shown on the calibration unit. Then go to step 8.

> **NOTICE**
>
> Do not be concerned if tonnage values do not display immediately on your AutoSet. Tonnage readings will appear if you keep turning the adjustment screw and cycling the press.

6. If the Load LED display 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 AutoSet so it matches the tonnage on your calibration unit, you must change jumper J115 to its “HI” setting. To do so:
   - Power down the AutoSet
   - Remove the jumper from the two lower pins and place it over the two upper pins (see Figure 3-9)
   - Power up the AutoSet
   - Cycle the press to display a tonnage reading

NOTICE

When you cycle the press, the Load LED displays may flash, indicating that tonnage is now over 120% of full scale. To clear this error, press the RESET button or turn the DISPLAY switch to the RESET position, holding the button or switch for less than two seconds. After you reset the unit, the reading shown in the Load LED display 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 AutoSet and on the calibration unit. Continue adjusting the potentiometer downward and cycling the press until the tonnage on your AutoSet is identical to the tonnage on the calibration unit.

NOTICE

If the Load LED displays continue to flash as you make potentiometer adjustments and cycle the press, press the RESET button or turn the DISPLAY switch to the RESET position to reset the unit.

8. Cycle the press and compare the reading in the Right (AutoSet 1500) or Right Rear (AutoSet 1504) Load LED display 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 AutoSet 1504 unit, repeat steps 4 through 7 for the Left Front and Right Front strain links. Refer to Table 3-5 for processor board labels identifying the gain potentiometer and high/low gain jumper for each of these strain links.
10. Move the lever on switch S102 from “OPERATE” to “CALFACTOR.”

    The message “CAL” appears in the Load LED displays, and numbers between 40 and 960 are shown in the Setpoints LED displays. These numbers are the “calfactors,” or calibration settings, for your AutoSet.
11. Record the calfactor and high/low gain jumper setting for each strain link channel on your AutoSet, two pairs of settings for AutoSet 1500, four pairs of settings for AutoSet 1504.

    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 here. Simply set switch S102 to “CALIBRATE,” move high/low gain jumpers to the correct position, and adjust each potentiometer to the calfactor you have recorded.

    The AutoSet label on the inside cover of the AutoSet enclosure provides space to record calfactor and high/low gain jumper settings, as shown in Figure 3-10, page 3-19.

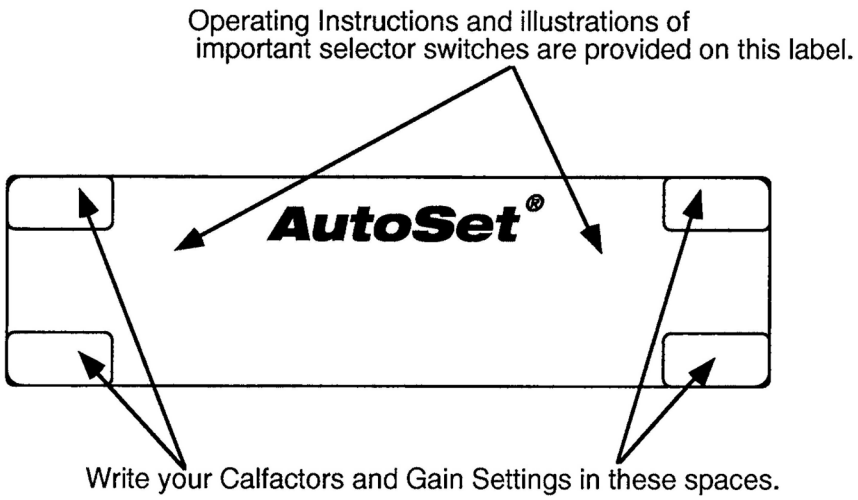


Figure 3-10. AutoSet Label Showing Locations for Recording Calfactors and Jumper Settings

12. Move the lever on switch S102 back to the "OPERATE" position. Your AutoSet load analyzer is now ready to use.

Checking Linearity

After you calibrate your AutoSet, you can check to see whether tonnage readings increase proportionally with increases in load. For example, if AutoSet 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 AutoSet 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 AutoSet with the load displays on the calibration unit, readings should continue to be identical.

If tonnage readings on the AutoSet 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 AutoSet 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 Standard AutoSet load analyzers, set the "% TOL" indicator dial on the AutoSet processor board to position 1 (i.e., 2%), referring to *Setting the Percent High Tolerance*, page 4-5.

   or

   On AutoSet Plus units, set the "% REP" indicator dial on the AutoSet processor board to position 1 (i.e., 1%), referring to *Setting the Percent Repeatability Tolerance (AutoSet Plus Only)*, page 4-6.
3. Run a few parts. On standard AutoSets, the 2% high tolerance setting should generate a high tonnage fault. On AutoSet Plus units, the 1% repeatability setting should generate a repeatability fault.
4. Check to make sure that the press top-stops, that the message "HI" (standard AutoSets) or "rEP" (AutoSet Plus units) flashes in the Setpoints LED display(s) for the out-of-range strain link(s), and that the tonnage values flash in the Load LED display(s) on the affected channels.
5. If AutoSet displays a message 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 high tonnage (standard AutoSet) or repeatability (AutoSet Plus) setpoint.
6. If the press is working properly, clear the fault by pressing the RESET button briefly (standard AutoSet) or turning the DISPLAY switch briefly to RESET (AutoSet Plus).

   Your AutoSet is now ready for use. Refer to Chapter 4 to learn how to make the settings AutoSet uses to calculate high tonnage and repeatability setpoints.

Chapter 4. Operation

This chapter explains the process by which AutoSet calculates setpoints and shows you how to make the settings AutoSet uses in its calculations. The chapter is organized in the following sections:

AutoSet's Setpoint Calculation Process

AutoSet creates and displays setpoints automatically based on settings you make on the AutoSet processor board. On standard AutoSet units, you make two settings: sample period and percent high tolerance. On AutoSet Plus models, you make three settings: sample period, percent high tolerance, and percent repeatability tolerance.

The sample period is the number of strokes during which AutoSet collects tonnage information for calculating setpoints, using the highest measured load as the reference tonnage. During the sample period, setpoints are maintained at 120% of the full-scale capacity of the press to provide overload protection. The sample period can be set to 1 or 15 strokes.

> **NOTICE**
>
> **AUTOSET SETPOINTS NEVER EXCEED 120%**
>
> AutoSet will not create setpoints greater than 120% of the full-scale capacity of the press.

Percent high tolerance is the percentage above the reference tonnage at which AutoSet establishes high tonnage setpoints. High tonnage setpoints are calculated using the following formula:

High setpoint = Highest measured load + (highest measured load x high setpoint percentage)

Available percent high tolerance settings are: 2%, 5%, 10%, 15%, 20%, 25%, 35%, 50%, and 100%.

Percent repeatability tolerance is the percentage of the reference tonnage at which AutoSet establishes repeatability setpoints. Repeatability setpoints are calculated as follows:

Repeatability setpoint = Highest measured load x repeatability setpoint percentage

Available percent repeatability tolerance settings are: 1%, 2%, 3%, 5%, 7%, 10%, 15%, 25%, and 50%.

AutoSet samples the load at each strain link simultaneously, selecting the highest measured load at each strain link as the reference tonnage to use in calculating setpoints. Tonnage is sampled at two strain links in AutoSet 1500 and at four strain links in AutoSet 1504.

Example: Calculation of High and Repeatability Setpoints in AutoSet 1504 Plus

An AutoSet 1504 Plus load analyzer is installed on a 200-ton press. The percent high tolerance is set to 15%, the percent repeatability tolerance to 5%, and the sample period to 15 strokes.

The DISPLAY switch is turned to the RESET position and held for at least two seconds to initiate the setpoint calculation process. The Setpoints displays on the AutoSet front panel change to 60.0 tons each (i.e., 120% of 50 tons, which is the full-scale tonnage for each corner of the press). Then, the press is run for 15 strokes.

Graphs displaying the tonnage measured on each stroke at each strain link during the sample period and the high and repeatability setpoints calculated based on these tonnage samples are shown in Figure 4-1.

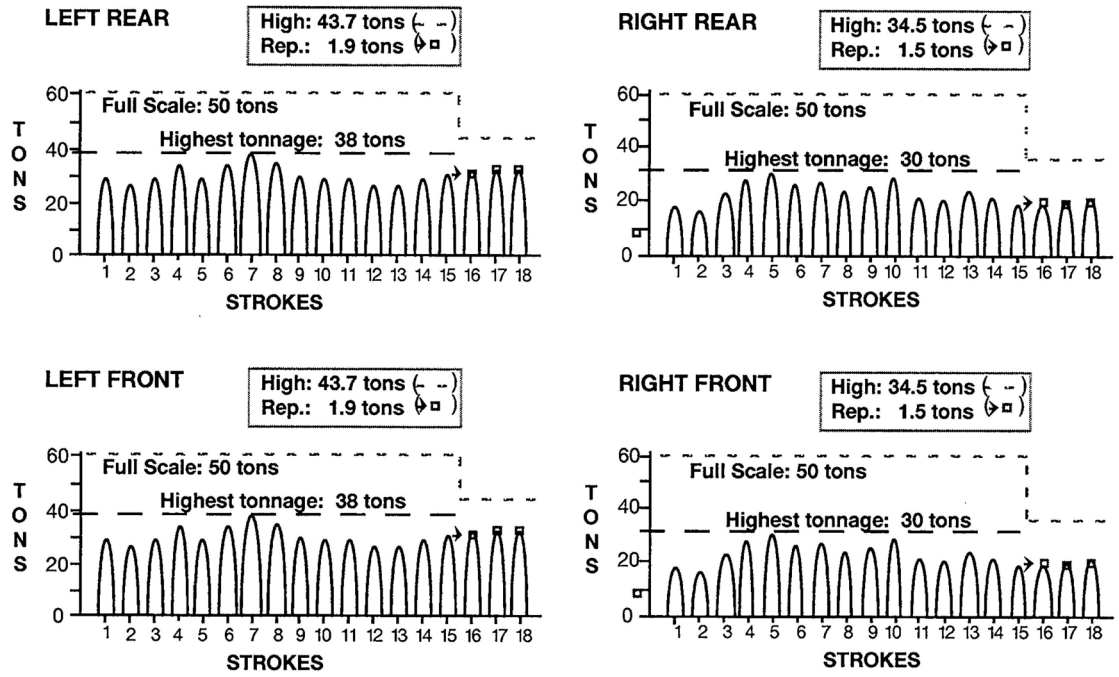


Figure 4-1. Setpoint Calculation Example: Tonnage Produced at Each Strain Link

As shown in Figure 4-1, the highest load measured during the sample period on Left Front and Left Rear strain links is 38 tons, which occurs on stroke 7. The highest load on Right Front and Right Rear strain links is 30 tons, which occurs on stroke 5. (Highest measured load is shown as identical on front and rear strain links for convenience.)

Using these reference tonnages, setpoints for left and right strain links are calculated as follows:

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

High setpoint right = 30 tons + (30 tons x .15) = 30 + 4.5 = 34.5 tons

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

Repeatability setpoint right = 30 tons x .05 = 1.5 tons

AutoSet displays the results of its setpoint calculations in the Setpoints LED displays on the front panel. Two setpoints are shown for 1500 and 1500 Plus AutoSets, four setpoints for 1504 and 1504 Plus units.

Only high setpoints are displayed on standard AutoSet 1500 and 1504 units. On AutoSet 1500 Plus and 1504 Plus models, either high or repeatability setpoints are displayed, depending on the position to which you set the DISPLAY switch (i.e., "HIGH" or "REPEATABILITY").

AutoSet calculates new setpoints whenever the RESET button is depressed for at least two seconds (1500 and 1504 AutoSets) or the DISPLAY switch is turned to "RESET" and held for at least two seconds (1500 Plus and 1504 Plus units). Setpoints are displayed after the sample period is completed. AutoSet also calculates new setpoints whenever you change the percent high tolerance or percent repeatability tolerance setting.

On AutoSet 1500 Plus and 1504 Plus units, both high and repeatability setpoints are active while the press is running regardless of the DISPLAY switch setting. Setpoints can be recalculated even when the press is running.

AutoSet uses the settings you specify for percent high tolerance and percent repeatability tolerance to calculate setpoints for all dies used on the press. If you want different settings used for individual dies, you must change settings. See *Changing Setpoint Percentage Settings*, page 4-12.

Setting the Sample Period

The sample period is the number of strokes during which AutoSet collects tonnage values to use in calculating setpoints for high tonnage and, in AutoSet Plus units, repeatability. You can select one of two sample periods–1 stroke or 15 strokes.

As a rule of thumb, use the 15-stroke sample period when running in Continuous mode or when the percent high tolerance setting is less than 50% or the percent repeatability setting is less than 25%.

Use the 1-stroke sample period when the percent high tolerance setting is greater than 50% or the percent repeatability setting is greater than 25%.

NOTICE

15-STROKE SAMPLE PERIOD YIELDS GREATER TONNAGE ACCURACY

If you are unsure which setting to use, set the sample period to 15 strokes. The 15-stroke setting yields more accurate tonnage readings. The 1-stroke setting is used mainly for convenience in low-tolerance jobs.

To set the number of strokes in the sample period, follow these steps:

1. Open the cover of the AutoSet enclosure and locate the Mode switch block (S101) just to the right of the ribbon cable connector on the left side of the AutoSet processor board (see Figure 4-2).

   Mode switch #1 controls the length of the sample period and is set at the factory to the OFF position (left side of S101), which specifies a sample period of 15 strokes, as shown in Figure 4-2.

2. To change the sample period setting to 1 stroke, move switch #1 to the right, or ON, position, using a ballpoint pen or small screwdriver.

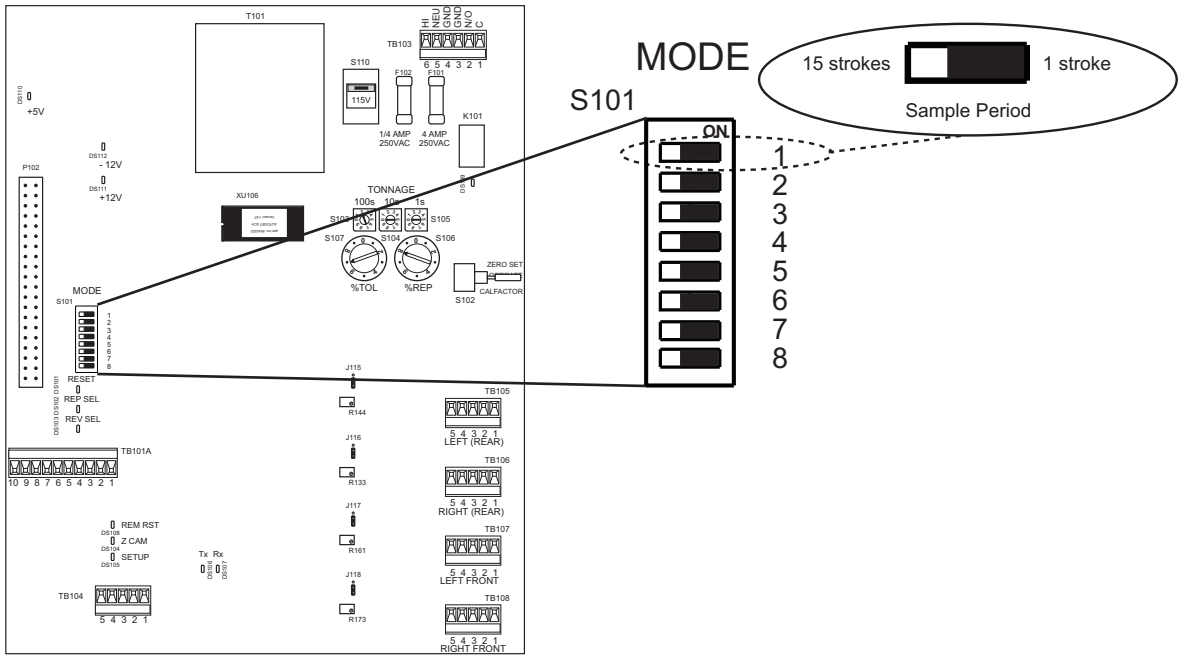


Figure 4-2. AutoSet 1504 Processor Board: Mode Switch #1 Set to OFF (15-Stroke Sample Period)

3. To reset the sample period to 15 strokes, move switch #1 to the left, or OFF, position.

4. On standard AutoSets, press the RESET button on the front panel and hold it for at least two seconds until the Setpoints displays flash and the setpoint readings change to 120% of full-scale tonnage

   or

   On AutoSet Plus units, turn the DISPLAY switch on the front panel to the “RESET” position and hold it for at least two seconds until the Setpoints displays flash and the setpoint readings change to 120% of full-scale tonnage.

   A new sample period will be initiated the next time you run the press.

Setting the Percent High Tolerance

The percent high tolerance setting specifies the percentage above the measured load at which AutoSet establishes high tonnage setpoints. To set this percentage, do the following:

1. Verify that the die installed on the press is properly adjusted and ready to make parts.
2. Open the AutoSet enclosure and locate the "% TOL" indicator dial, labelled "S107," at the upper right of the AutoSet processor board (see Figure 4-3).

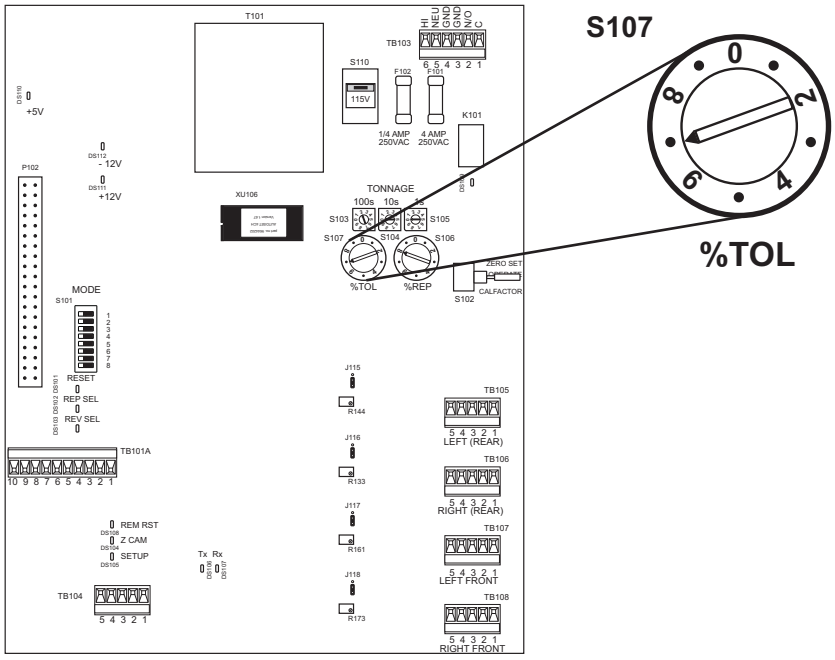


Figure 4-3. AutoSet 1504 Plus Processor Board: Percent High Tolerance Dial

3. Turn the "% TOL" dial to the number (1-9) representing the percentage you want, referring to Table 4-1, page 4-6 for the percentage represented by each number. (A diagram inside the cover of the AutoSet enclosure also documents percent high tolerance settings.)

   To determine the correct high tolerance setting for your standard AutoSet or AutoSet Plus unit, refer to *Determining the Correct High Tolerance Setting (Standard AutoSet)*, page 4-8 or *Determining the Correct High Tolerance and Repeatability Settings (AutoSet Plus)*, page 4-9.

Table 4-1. Percent High Tolerance Selector Settings

Numeric Setting on Dial	High Tolerance Percent
1	2%
2	5%
3	10%
4	15%
5	20%
6	25%
7	35%
8	50%
9	100%
0	Disable setpoints *

* When setpoints are disabled, AutoSet stops the press only when the load exceeds 120% of the full-scale tonnage.

NOTICE

DISABLING SETPOINT CALCULATION

When the "% TOL" indicator dial is set to "0," the high setpoint calculation function is disabled and AutoSet does not create high tonnage setpoints. With a zero ("0") setting, your press is not protected against overloads; however, AutoSet will stop the press if the load exceeds 120% of the full-scale tonnage. If you have an AutoSet Plus unit and disable high tonnage setpoints but do not disable repeatability setpoints, AutoSet will stop the press if the tonnage difference between strokes exceeds repeatability setpoints.

Setting the Percent Repeatability Tolerance (AutoSet Plus Only)

If you have an AutoSet Plus unit, you can also create setpoints for repeatability, the stroke-to-stroke variation in tonnage. The percent repeatability tolerance setting specifies the percentage of stroke-to-stroke variation at which AutoSet establishes repeatability setpoints. To set this percentage, do the following:

1. Verify that the die installed on the press is properly adjusted and ready to make parts.
2. Open the AutoSet enclosure and locate the "% REP" indicator dial, labelled "S106," at the upper right of the AutoSet processor board (see Figure 4-4, page 4-7).

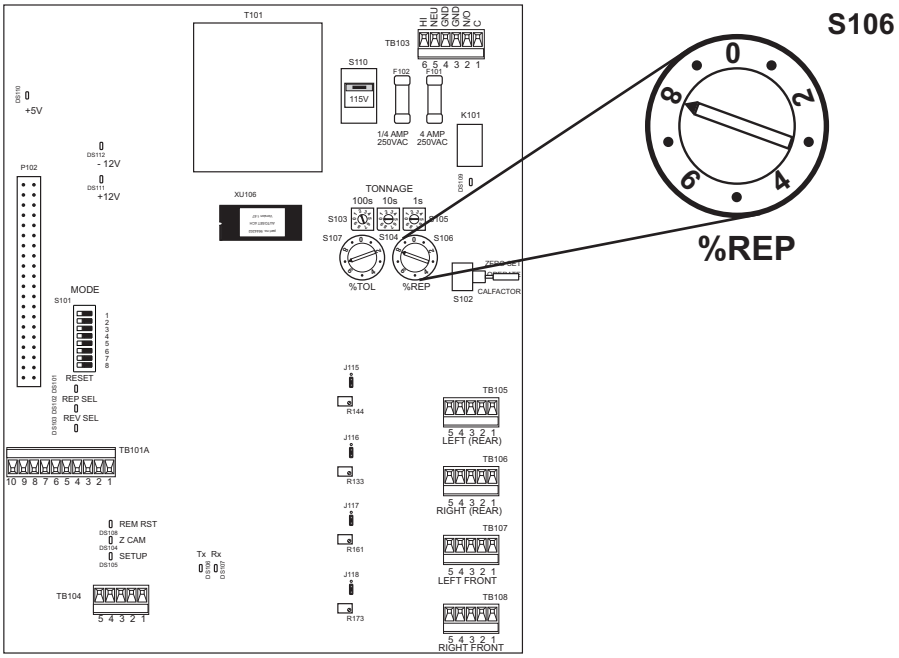


Figure 4-4. AutoSet 1504 Plus Processor Board: Percent Repeatability Dial

3. Turn the "% REP" dial to the number (1-9) representing the percentage you want, referring to Table 4-2 for the percentage represented by each number. (A diagram inside the cover of the AutoSet enclosure also documents percent repeatability settings.)

Table 4-2. Percent Repeatability Selector Settings

Numeric Setting on Dial	Repeatability Percent
1	1%
2	2%
3	3%
4	5%
5	7%
6	10%
7	15%
8	25%
9	50%
0	Disable setpoints *

* When setpoints are disabled, AutoSet stops the the press only when the load exceeds 120% of the full-scale tonnage.

NOTICE

DISABLING SETPOINT CALCULATION

When the "% REP" indicator dial is set to "0," the repeatability setpoint calculation function is disabled and AutoSet does not create repeatability setpoints. With a zero ("0") setting, your press is not protected against repeatability faults; however, AutoSet will stop the press if the load exceeds 120% of the full-scale tonnage. If you have not disabled high tonnage setpoints, AutoSet will stop the press if the tonnage exceeds the high tonnage limits.

Determining the Correct High Tolerance Setting (Standard AutoSet)

The purpose of this procedure is to determine the lowest high tonnage setpoint at which AutoSet will not stop the press. The "% TOL" indicator dial must be set high enough to avoid nuisance stops, which occur when normal variations in tonnage cause AutoSet to stop the press, but not so high that the press is vulnerable to tonnage overloads.

The percent high tolerance setting must be capable of initiating a tonnage fault for any load that can potentially damage the press. A tonnage fault can 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.

To determine the correct high tolerance setting for a standard AutoSet 1500 or 1504 load analyzer, do the following:

1. Inside the AutoSet enclosure, turn the "% TOL" indicator dial on the AutoSet processor board to position 4 (i.e., 15%), referring to *Setting the Percent High Tolerance*, page 4-5.
2. Press the RESET button on the AutoSet front panel for at least two seconds to instruct AutoSet to recalculate setpoints when the press is restarted.

   The Setpoints displays flash and the setpoint readings change to values that are 120% of the full-scale tonnage of the press.

NOTICE

ERRATIC TONNAGE AT STARTUP

If you have not installed a zero cam, your standard AutoSet 1500 or 1504 unit may generate erratic tonnage readings as the press is starting up due to vibration and noise. To prevent these inconsistencies from influencing the accuracy of calculated setpoints, press the RESET button to initiate recalculation of setpoints *after* the press has completed its startup routine and tonnage has stabilized.

You can eliminate erratic tonnage readings by installing a zero cam (see *Installing a Zero Cam*, page 2-16).

3. If you are operating in Continuous mode, start and run the press until the sample period is completed and AutoSet displays new values in the Setpoints displays; then run the press for an additional 20 strokes.

If you are operating in Single-stroke mode, start and cycle the press until the sample period is completed and AutoSet displays new values in the Setpoints displays; then cycle the press for a few additional strokes.

4. If AutoSet stops the press after the new setpoints have been calculated, do the following:

> **CAUTION**
>
> **PRESS STOPPED DUE TO TONNAGE FAULT**
>
> If the press was stopped due to a tonnage fault rather than a nuisance stop (i.e., setpoints that have been set too low), do not continue with this procedure until you have corrected the problem. Otherwise, damage to the press and tooling may result.
>
> **Failure to comply with these instructions could result in property damage.**

   a. Establish that the press stopped due to low setpoints by checking for malfunctions such as a stuck part, load imbalance, misfeed, etc.

   b. If the press stopped because setpoints were too low, turn the "% TOL" indicator dial up to position 5 (i.e., 20%), and repeat steps 2 and 3.

   c. If AutoSet stops the press again, turn the "% TOL" dial to the next higher setting, and repeat steps 2 and 3. Repeat this step until the "% TOL" setting is high enough so that AutoSet does not stop the press.

5. If AutoSet does not stop the press after the new setpoints have been calculated, do the following:

   a. Turn the "% TOL" indicator dial down to position 3 (i.e., 10%), and repeat steps 2 and 3.

   b. If AutoSet stops the press, establish that the press stopped due to low setpoints, referring to step 4a. If low setpoints are the cause of the press stopping, turn the "% TOL" indicator dial back to its previous position. This is the correct setting for the job.

   c. If AutoSet does not stop the press, turn the "% TOL" indicator dial to the next lower position, and repeat steps 2 and 3.

   d. If AutoSet stops the press, repeat step 5b.

      If AutoSet does not stop the press, repeat step 5c.

Determining the Correct High Tolerance and Repeatability Settings (AutoSet Plus)

The purpose of this procedure is to determine the highest repeatability setpoint at which AutoSet will not stop the press. The "% REP" indicator dial must be set high enough to avoid nuisance stops, which occur when normal stroke-to-stroke tonnage variations cause AutoSet to stop the press, but not so high that the press is vulnerable to repeatability overloads. Once the correct repeatability setting is determined, the percent high tolerance can be set to a value greater than the repeatability setting, typically about two times greater.

The percent high tolerance setting must be capable of initiating a tonnage fault for any load that can potentially damage the press. A tonnage fault can 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.

To determine the correct repeatability and high tolerance settings for an AutoSet 1500 Plus or 1504 Plus load analyzer, do the following:

1. Inside the AutoSet enclosure, turn the "% REP" indicator dial on the AutoSet processor board to position 4 (i.e., 5%), referring to *Setting the Percent Repeatability Tolerance (AutoSet Plus Only)*, page 4-6. Then, turn the "% TOL" dial also to position 4 (i.e., 15%), referring to *Setting the Percent High Tolerance*, page 4-5.
2. Turn the DISPLAY switch on the AutoSet front panel to the RESET position and hold for at least two seconds to instruct AutoSet to recalculate setpoints when the press is restarted.

   The Setpoints displays flash and the setpoint readings change to values that are 120% of the full-scale tonnage of the press.
3. If you are operating in Continuous mode, start and run the press until the sample period is completed and AutoSet displays new values in the Setpoints displays; then run the press for an additional 20 strokes.

   If you are operating in Single-stroke mode, start and cycle the press until the sample period is completed and AutoSet displays new values in the Setpoints displays; then cycle the press for a few additional strokes.

   High tonnage setpoints are displayed when the DISPLAY switch is turned to the HIGH position. Repeatability setpoints are displayed when the DISPLAY switch is turned to the REPEATABILITY position.
4. If AutoSet stops the press after the new setpoints have been calculated due to a repeatability fault (indicated by a flashing channel Load display and the abbreviation "rEP" appearing in the corresponding Setpoints display), do the following:

> **CAUTION**
>
> **PRESS STOPPED DUE TO TONNAGE FAULT**
>
> If the press was stopped due to a tonnage fault rather than a nuisance stop (i.e., setpoints that have been set too low), do not continue with this procedure until you have corrected the problem. Otherwise, damage to the press and tooling may result.
>
> **Failure to comply with these instructions could result in property damage.**

   a. Establish that the press stopped due to low setpoints by checking for malfunctions such as a stuck part, load imbalance, misfeed, etc.
   b. If the press stopped because repeatability setpoints were too low, turn the "% REP" indicator dial up to position 5 (i.e., 7%), and repeat steps 2 and 3.
   c. If AutoSet stops the press again, turn the "% REP" dial to the next higher setting, and repeat steps 2 and 3. Repeat this step until the "% REP" setting is high enough so that AutoSet does not stop the press.

d. When you have determined the correct repeatability setting, set the "% TOL" indicator dial to approximately twice that value.

5. If AutoSet stops the press after the new setpoints have been calculated due to a high tonnage fault (indicated by a flashing channel Load display and the abbreviation "HI" appearing in the corresponding Setpoints display), do the following:
   a. Establish that the press stopped due to low setpoints by checking for malfunctions such as a stuck part, load imbalance, misfeed, etc.
   b. If the press stopped because high tonnage setpoints were too low, turn the "% TOL" indicator dial up to position 5 (i.e., 20%), turn the "% REP" dial down to position 3 (i.e., 3%), and repeat steps 2 and 3.
   c. If AutoSet stops the press due to a repeatability fault but displays no high tonnage error, turn the "% REP" dial back to position 4 (i.e., 5%), and repeat steps 2 and 3. If AutoSet stops the press, turn the "% REP" dial up to the next higher setting. Continue this process until you get no more repeatability faults.
   d. If AutoSet stops the press due to a high tonnage fault but displays no repeatability error, turn the "% TOL" dial up to position 6 (i.e., 25%), and repeat steps 2 and 3. If AutoSet stops the press, turn the "% TOL" dial up to the next higher setting. Continue this process until you get no more high tonnage faults.
6. If AutoSet stops the press after the new setpoints have been calculated due to both a repeatability and high tonnage fault (indicated by a flashing channel Load display and the abbreviations "rEP" and "HI" appearing alternately in the corresponding Setpoints display), do the following:
   a. Establish that the press stopped due to low setpoints by checking for malfunctions such as a stuck part, load imbalance, misfeed, etc.
   b. If the press stopped because repeatability and high tonnage setpoints were too low, turn the "% REP" indicator dial up to position 5 (i.e., 7%), turn the "% TOL" dial also up to position 5 (i.e., 20%), and repeat steps 2 and 3.
   c. If AutoSet stops the press due to a repeatability fault but displays no high tonnage error, turn the "% REP" dial up to position 6 (i.e., 10%), and repeat steps 2 and 3. If AutoSet stops the press, turn the "% REP" dial up to the next higher setting. Continue this process until you get no more repeatability faults.
   d. If AutoSet stops the press due to a high tonnage fault but displays no repeatability error, turn the "% TOL" dial up to position 6 (i.e., 25%), and repeat steps 2 and 3. If AutoSet stops the press, turn the "% TOL" dial up to the next higher setting. Continue this process until you get no more repeatability faults.
   e. If AutoSet stops the press due to both a repeatability and high tonnage fault, turn the "% REP" dial up to position 6 (i.e., 10%), turn the "% TOL" dial up to position 6 (i.e., 25%), and repeat steps 2 and 3. If AutoSet stops the press due to a repeatability or high tonnage fault, perform step 6c or 6d. If AutoSet stops the press due to both a repeatability and high tonnage fault, turn the "% REP" and "% TOL" dials up to the next higher setting. Continue this process until you get no more repeatability and high tonnage faults.

7. If AutoSet does not stop the press after the new setpoints have been calculated, do the following:
   a. Turn the "% REP" indicator dial down to position 3 (i.e., 3%), and repeat steps 2 and 3.
   b. If AutoSet stops the press, establish that the press stopped due to low setpoints, referring to step 4a. If low setpoints are the cause of the press stopping, turn the "% REP" indicator dial back to its previous position (i.e., position 4, or 5%), and turn the "% TOL" dial to a setting that is approximately twice that of the "% REP" selector (i.e., position 3, or 10%). These are the correct settings for the job.
   c. If AutoSet does not stop the press, turn the "% TOL" indicator dial to the next lower position, and repeat steps 2 and 3.
   d. If AutoSet stops the press, repeat step 7b.
   e. If AutoSet does not stop the press, repeat step 7c.

Changing Setpoint Percentage Settings

Once you have established setpoint percentages for high tonnage (standard AutoSet) or for high tonnage and repeatability (AutoSet Plus) on one die, you can use these settings for all other dies you run on the press.

There may be situations, however, in which you will want to change setpoint percentages. For example, you may want to create tighter setpoints for some jobs to provide greater protection for the press; on other jobs, looser setpoints may be desired to prevent unnecessary faults and press shutdowns.

NOTICE

ALWAYS RECORD PERCENTAGE SETTINGS FOR SETPOINTS

Be sure to write down the percentages used in creating setpoints for any tool with settings different from those that are standard on your press. Then, when you re-use the tool, you can simply dial in the old settings.

Recalculating Setpoints after a Tool Change

Even though "% TOL" and "% REP" settings may be the same for different dies, you must always recalculate setpoints after a tool change so they are based on the new press load. To recalculate setpoints, do the following:

NOTICE

Setpoints can be recalculated while the press is running.

1. On standard AutoSets, press the RESET button and hold for at least two seconds or until the Setpoints LED displays flash once and change to 120% of full-scale tonnage

   or

   On AutoSet Plus units, turn the DISPLAY switch to the RESET position and hold for at least two seconds or until the Setpoints LED displays flash once and change to 120% of full-scale tonnage.

2. Start the press. AutoSet will recalculate setpoints after the sample period is completed and display them in the Setpoints LED displays.

   On AutoSet Plus units, Setpoints displays show high tonnage setpoints if the DISPLAY switch is turned to the HIGH position and repeatability setpoints if the DISPLAY switch is turned to the REPEATABILITY position.

Displaying Reverse Load (AutoSet Plus Only)

AutoSet 1500 Plus and 1504 Plus load analyzers enable you to display reverse tonnage. To do so, perform the following step:

1. On the AutoSet front panel, press the REVERSE button. As shown in Figure 4-5, the message "reV" appears in the Setpoints LED displays, and the reverse tonnage appears in the Load displays.

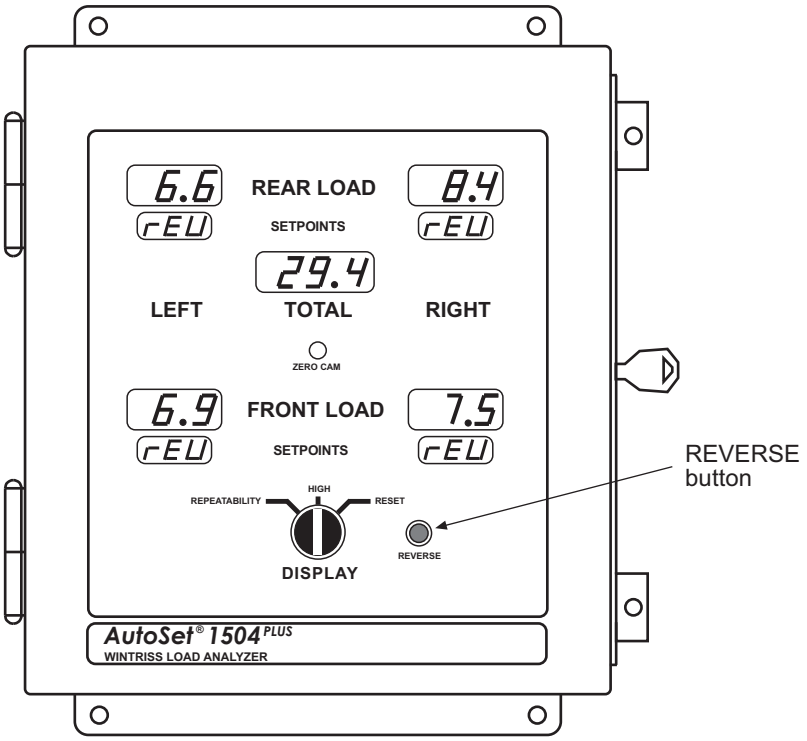


Figure 4-5. AutoSet 1504 Plus Front Panel Showing Reverse Tonnage LED Displays

Four-Channel to Two-Channel Conversion

If you have a four-channel AutoSet and you want it to operate like a two-channel unit, you can set Mode switch #7 on switch block S101 on the AutoSet Processor board to ON, as shown in Figure 4-6. When this setting is selected, channel tonnage readings appear only in the Rear Load LED displays, and setpoints are shown only in the Rear Setpoints displays. The Total Load LED display continues to show the total tonnage, a reading not available in a two-channel AutoSet.

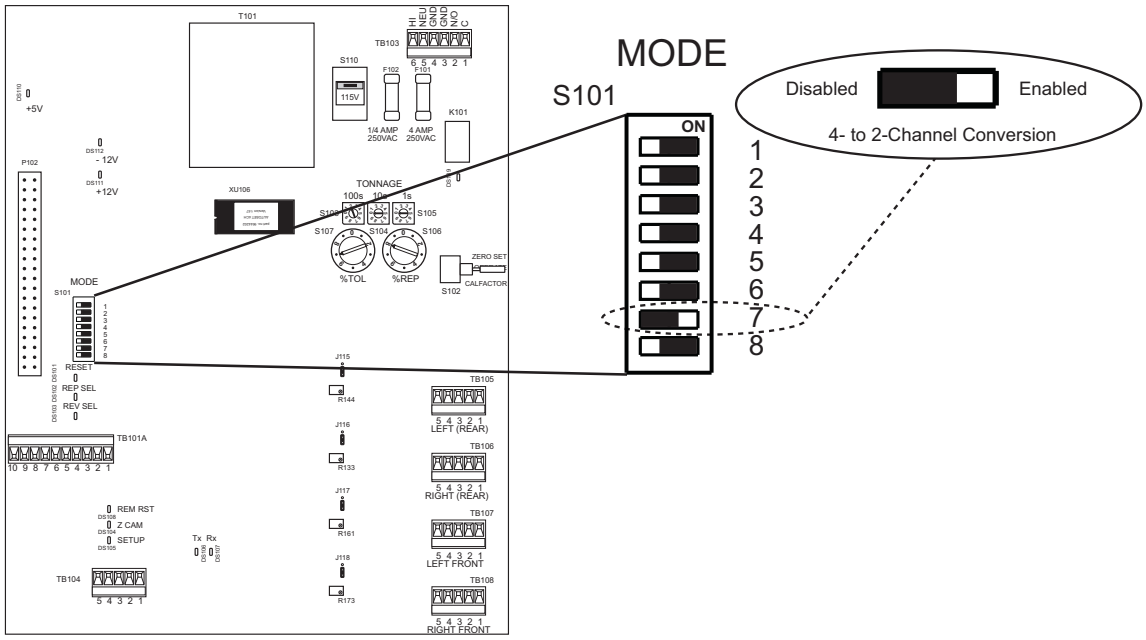


Figure 4-6. AutoSet 1504 Processor Board: Mode Switch #7 Set to ON (2-Ch. Operation)

Disabling AutoSet

You can disable AutoSet so the unit does not create setpoints and will only stop the press when tonnage at any of the strain links exceeds 120% of full-scale tonnage.

> **NOTICE**
>
> Wintriss does not recommend the disabling of AutoSet. Disabling the load analyzer may result in damage to the press and tooling.

To disable AutoSet, do the following:

1. On standard AutoSet units, turn the "% TOL" indicator dial to zero (0) (see *Setting the Percent High Tolerance*, page 4-5)

   or

   On AutoSet Plus units, turn both the "% TOL" and "% REP" indicator dials to zero (0) (see *Setting the Percent Repeatability Tolerance (AutoSet Plus Only)*, page 4-6).

2. On standard AutoSets, press the RESET button and hold for at least two seconds or until the LED displays flash

   or

   On AutoSet Plus load analyzers, turn the DISPLAY switch to the RESET position and hold for at least two seconds or until the LED displays flash.

   The next time you run the press, AutoSet clears the old setpoints and displays high tonnage setpoints that are 120% of press capacity and repeatability setpoints that are 120% of press capacity.

Turning Off and Restoring Power

When power to the AutoSet is turned off, Load and Setpoints LED readings are lost. However, since calibration and full-scale tonnage settings are intact, AutoSet will display correct Load and Setpoints values when power is restored and setpoints recalculated. When power is first restored, the Load displays will read zero and the Setpoints displays show values that are 120% of full-scale tonnage. When you restart the press, AutoSet will recalculate setpoints after the number of strokes set for the sample period, displaying those setpoints in the Setpoints LEDs and the tonnage for the current stroke in the Load LEDs.

Chapter 5. Troubleshooting

This chapter shows you how to respond to AutoSet faults, perform troubleshooting on a few common AutoSet problems, and use the LEDs on the AutoSet processor board for diagnostics. It is organized in the following sections:

Responding to AutoSet Faults

When a setpoint is exceeded on one or more strain links, AutoSet opens the output relay and stops the press, simultaneously activating special fault displays on its front panel. The strain link channel(s) on which the fault occurred are indicated by a flashing Load LED display. The type of fault is shown by an abbreviation (e.g., HI, rEP, Err) in the corresponding Setpoints LED display, which also flashes. On AutoSet 1504 and 1504 Plus units, the Total LED display also flashes during a fault condition.

Before clearing the fault with the RESET button (standard AutoSet) or DISPLAY switch (AutoSet Plus), make sure to determine whether the fault was simply a nuisance stop or was caused by an actual press or die malfunction.

If the fault was the result of a nuisance stop, you need to reset the percent high tolerance dial (all AutoSet models), percent repeatability dial (AutoSet Plus units only), or both dials (AutoSet Plus units only) so that AutoSet can create more realistic setpoints. See Chapter 4 for instructions on how to set these dials.

> **CAUTION**
>
> If the press stopped due to a press or die malfunction, 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:

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

To clear the fault, press the RESET button (standard AutoSet) or turn the DISPLAY switch to the RESET position (AutoSet Plus). Press the RESET button or hold the DISPLAY switch at the RESET position only briefly (i.e., less than two seconds). Otherwise, AutoSet will recalculate setpoints.

NOTICE

HOLD THE RESET BUTTON OR DISPLAY SWITCH FOR LESS THAN TWO SECONDS

If you press the RESET button (standard AutoSet) or hold the DISPLAY switch at the RESET position (AutoSet Plus) for more than two seconds, AutoSet will recalculate setpoints instead of resetting the fault.

When you reset the load analyzer, displays will stop flashing, and the "HI," "rEP," or "Err" message will disappear from the Setpoints display(s), being replaced by the setpoint value. The tonnage value(s) at fault will remain in the Load displays until the press takes the next stroke or power is turned off.

The four types of fault conditions are described below.

High Tonnage Faults

AutoSet displays a high tonnage fault when the tonnage on one or more strain link inputs exceeds the high tonnage setpoint. A high tonnage fault is indicated on the front panel as follows (see Figure 5-1):

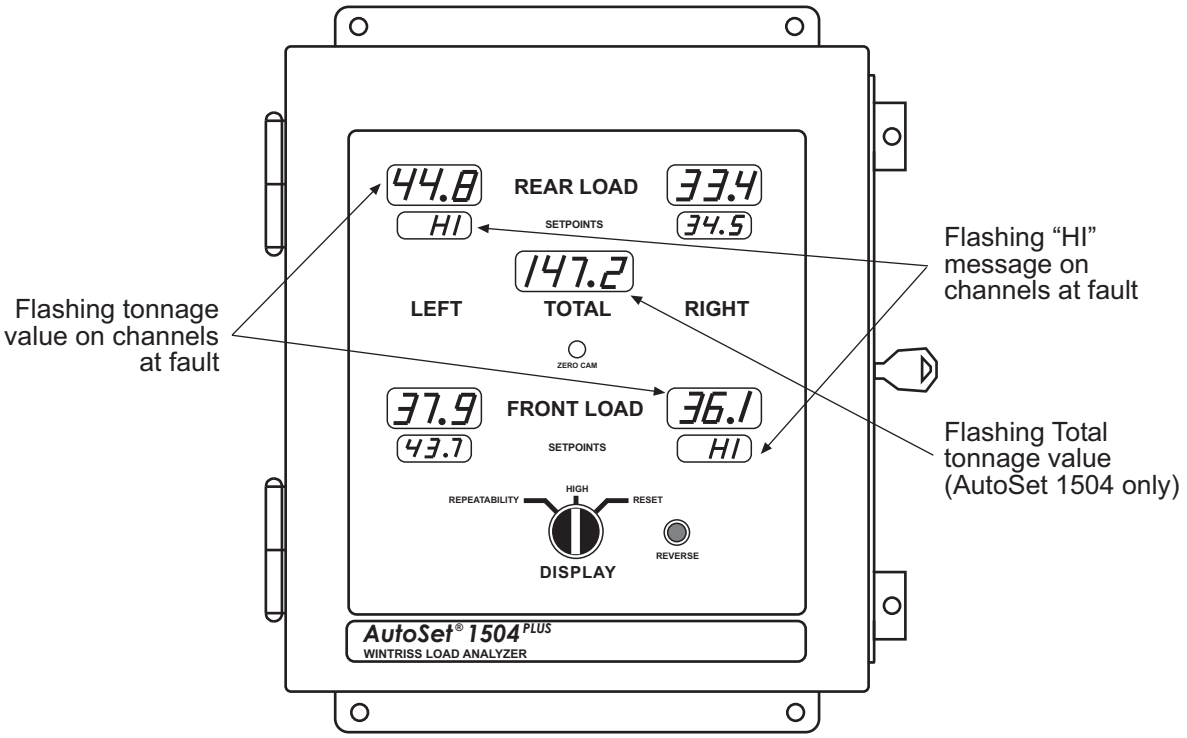


Figure 5-1. AutoSet 1504 Plus Front Panel Displaying High Setpoint Faults

- The Load LED display flashes on each strain link channel at fault
- The message “HI” flashes in the corresponding Setpoints LED display(s)
- On AutoSet 1504 and 1504 Plus units, the Total LED display flashes

Repeatability Faults

AutoSet displays a repeatability fault when variation in tonnage from one stroke to the next exceeds the repeatability setpoint. A repeatability fault is indicated on the front panel as follows (see Figure 5-2):

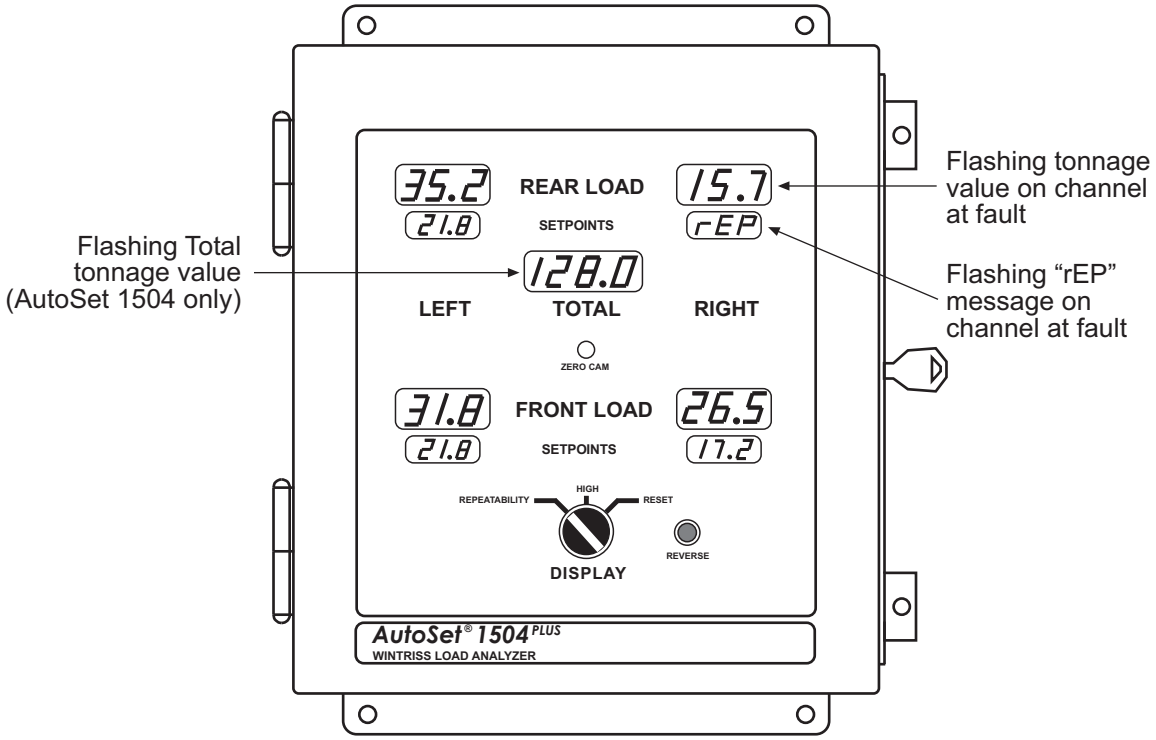


Figure 5-2. AutoSet 1504 Plus Front Panel Displaying Repeatability Fault

- The Load LED display flashes on each strain link channel at fault
- The message “rEP” flashes in the corresponding Setpoints LED display(s)
- On AutoSet 1504 and 1504 Plus units, the Total LED display flashes

High Setpoint and Repeatability Faults

AutoSet displays both high tonnage and repeatability faults when tonnage on one or more strain link inputs exceeds the high tonnage setpoint and stroke-to-stroke tonnage variation on one or more strain links exceeds the repeatability setpoint. High tonnage and repeatability faults are indicated simultaneously on the front panel as follows (see Figure 5-3, page 5-4):

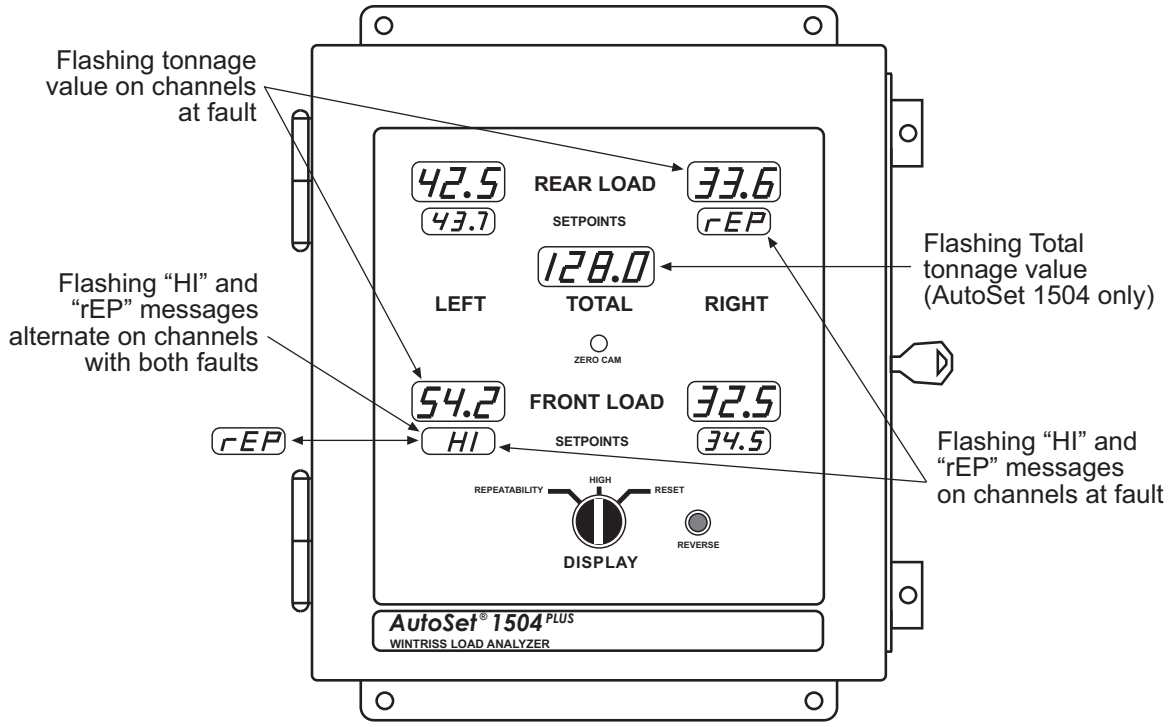


Figure 5-3. AutoSet 1504 Plus Front Panel Displaying High Setpoint and Repeatability Faults

- The Load LED display flashes on each strain link channel at fault
- The message "HI" or "rEP" flashes in the Setpoints LED displays for channels with a high setpoint or repeatability fault
- The messages "HI" and "rEP" flash alternately in the Setpoints LED display(s) for channels with both a high setpoint and a repeatability fault
- On AutoSet 1504 and 1504 Plus units, the Total LED display flashes

Offset Errors

AutoSet 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. An offset error is indicated on the front panel as follows (see Figure 5-4, page 5-5):

- The message "Err" flashes in the Setpoints display(s) for each strain link channel at fault
- The message "HI" or "LO" flashes in the corresponding Load display
- On AutoSet 1504 and 1504 Plus units, the message "Err" flashes in the Total LED display

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 the solutions shown above fixes the problem, the strain link may be damaged and should be replaced.

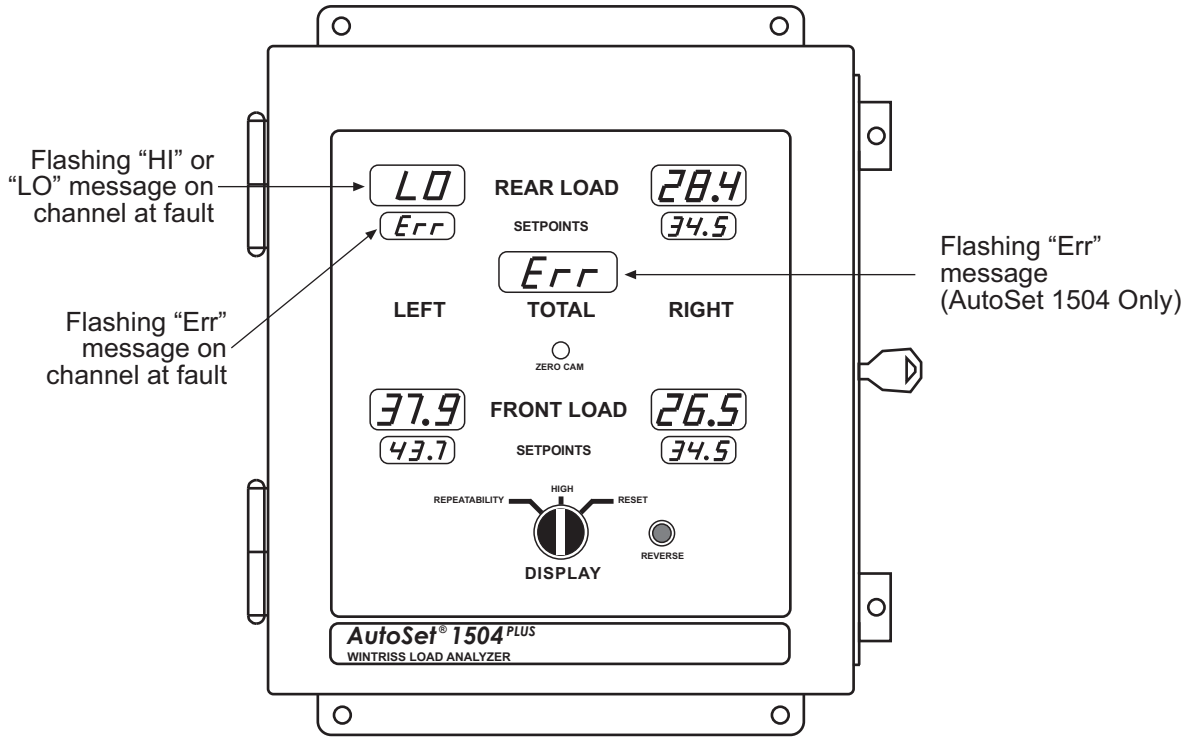


Figure 5-4. AutoSet 1504 Plus Front Panel Displaying Offset Error

If you remount or replace a strain link, you must rezero the strain link (refer to *Zeroing Strain Links*, page 3-1). When replacing a strain link, you do not have to recalibrate AutoSet unless you move the strain link to a different location.

Troubleshooting Common AutoSet Problems

The following sections show you how to troubleshoot several common AutoSet problems.

Load or Setpoints LED Displays Are Blank

If no values appear in the Load and/or Setpoints LED displays, do the following:

- Check to see whether you have power, referring to *Powering Up AutoSet*, page 2-28. Also check to see whether power is present on both sides of fuse F102 on the AutoSet processor board (see Figure 2-4 or Figure 2-5).
- Check the wiring of the strain links. Refer to *Wiring Strain Links*, page 2-14.
- If you are still having difficulty, contact Wintriss Tech. Support.

Front Load and Setpoints LED Displays Are Blank (4-Channel Units)

If no values appear in the Front Load and Setpoints LED displays on a 4-channel AutoSet, do the following:

- Check the setting of Mode switch #7 (see page 4-14). 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.
- 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.

Load LED Display(s) Shows Zero Tonnage

If one or more Load LED displays consistently read "0" tons, do the following:

- Check to make sure that the latching magnetic cam switch (LMCS) used for the zero cam function has been connected properly. Make sure that the LMCS is closed to ground during the top of the stroke and open at the bottom of the stroke. Also, check to make sure that the red and blue magnets are positioned at the correct angles on the crankshaft. See *Installing the Latching Magnetic Cam Switch (LMCS)*, page 2-17.
- Check to make sure that the mounting and wiring of the corresponding strain link(s) were performed correctly. Verify that the strain links are mounted on a flat, clean surface and are wired correctly. See *Installing Strain Links*, page 2-10.

Tonnage Shown in Load LED Displays Is Too Low

If the tonnage shown in one or more Load LED displays is lower than you think it should be, do the following:

New Installation or Calibration

- Check to make sure that the latching magnetic cam switch (LMCS) used for the zero cam function is closed to ground during the top of the stroke and open at the bottom of the stroke. Also, check to make sure that the red and blue magnets are positioned at the correct angles on the crankshaft. See *Installing the Latching Magnetic Cam Switch (LMCS)*, page 2-17.
- Check to make sure that the mounting and wiring of the corresponding strain link(s) was performed correctly. Verify that the strain links are mounted on a flat, clean surface. See *Installing Strain Links*, page 2-10.
- Check to make sure that the calibration was performed properly. Verify that the calfactors are correct. Check to make sure that the calfactors you set are the same as the ones you wrote down during the calibration. Refer to Chapter 3.

Existing Installation

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

Using LEDs As Diagnostic Tools

The following sections describe the functions of LEDs on the AutoSet processor board (see Figure 2-4 or Figure 2-5) and show you how to use them to diagnose problems.

Remote Reset, Zero Cam, and Setup LEDs

These three LEDs are located at the lower left of the AutoSet processor board just below the TB101B (1500 units) or TB101A (1504 models) connector and are labelled “Rem Rst” (DS108), “Z Cam” (DS104), and “Setup” (DS105).

The three LEDs, which are red, indicate the presence of wiring connections at the Remote Reset (pin 1), Zero Cam (pin 2), and Setup (pin 5 on TB101A, pin 8 on TB101B) terminals on TB101 connectors. (Pin 5 and pin 8 are not functional on standard AutoSet 1500 and 1504 units, which do not have a repeatability function and, therefore, do not support a Setup Mode.)

When the pin connection is wired properly, the corresponding LED should be lit. If one of these LEDs does not illuminate, you should first check the wiring at the appropriate pin number. If the wiring checks out, there may be a problem with that input. Contact Wintriss Tech. Support for assistance.

Reset, Repeatability Select, and Reverse Select LEDs

These three red LEDS are located just beneath the “Mode” switch block (S101) on the left side of the AutoSet processor board and are labelled “Reset” (DS101), “Rep Sel” (DS102), and “Rev Sel” (DS103). On AutoSet Plus units, these LEDs indicate whether the DISPLAY switch and REVERSE button on the front panel are working properly. On standard AutoSets, the “Reset” LED indicates whether the RESET button on the front panel is working.

The Reset LED should illuminate when the DISPLAY switch on AutoSet Plus units is turned to the RESET position or the RESET button on standard AutoSets is pushed. The Repeatability Select LED should light up when the DISPLAY switch on AutoSet Plus units is turned to the REPEATABILITY position. The Reverse Select LED should turn on when the REVERSE button on AutoSet Plus units is pushed. The “Rep Sel” and “Rev Sel” LEDs are not functional on standard AutoSet units.

If one of these LEDs does not illuminate when the appropriate switch is actuated, check the ribbon cable connections at the processor and display boards, the ribbon cable itself, and the wiring connections to the DISPLAY switch or RESET button. If the connections are good and the LED(s) still does not illuminate, call Wintriss Tech. Support.

Power Supply LEDs, +5V and ±12V

The three green LEDs labelled "+5V" (DS110), "+12V" (DS111), and "-12V" (DS112), which are located in the upper left corner of the AutoSet processor board, indicate whether +5V, +12V, and -12V circuits providing power to the board are energized. All three LEDs should normally be on. If all three LEDs are off, check the input power connections at TB103. If input power connections check out, and all three LEDs are still unlit, call Wintriss Tech. Support. Also contact Wintriss Tech. Support when only one or two LEDs are unlit.

Relay Status LED

The LED labelled DS109, located just below the solid-state output relay K101 at the top right of the AutoSet processor board, indicates the status of the K101 relay. When the relay is energized, DS109, which is red, is illuminated. When the relay is de-energized, indicating that a fault condition has occurred and a stop signal has been sent to the press, DS109 turns off.

Appendix A. Wiring and Settings Tables

This appendix provides tables identifying wiring connections and switch settings for components on the AutoSet processor board.

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

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

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

Table A-2. 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 A-3. 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.

Table A-4. TB101A and TB101B Wiring Connections

TB 101 A or B Pin No.	Auto Set 1500 (TB101B) Function	AutoSet 1500+ (TB101B) Function	AutoSet 1504 (TB101A) Function	AutoSet 1504+ (TB101A) Function
1	Remote Reset	Remote Reset	Remote Reset	Remote Reset
2	Zero Cam	Zero Cam	Zero Cam	Zero Cam
3	Aux Out	Aux Out	Aux Out	Aux Out
4	+12 VDC	+12 VDC	+12 VDC	+12 VDC
5	Ground	Ground	Unused	Setup
6	Ch 1 Out	Ch 1 Out	Ch 1 Out	Ch 1 Out
7	Ch 2 Out	Ch 2 Out	Ch 2 Out	Ch 2 Out
8	Unused	Setup	Ch 3 Out	Ch 3 Out
9			Ch 4 Out	Ch 4 Out
10			Ground	Ground

Table A-5. Mode Switch (S101) Settings

Switch No.	Function and Settings
1	Sample Period Length. Specifies the number of strokes in the sample period. Settings are: OFF 15 strokes ON 1 stroke
2	Zero Cam Enable/Disable. Enables and disables the zero cam function. Settings are: OFF Disable Zero Cam ON Enable Zero Cam
3	Decimal Point On/Off. Indicates whether a one-position decimal point (e.g., 55.5) is used in tonnage displays. Settings are: OFF Decimal point on ON Decimal point off
4	Unused
5	Setup Mode Enable/Disable. Enables or disables the Setup Mode circuit if one has been wired (see page 2-22). Settings are: OFF Setup Mode enabled ON Setup Mode disabled
6	AutoSet Number. Identifies each AutoSet module when two AutoSets are connected to one SmartPAC control. You must set this switch on both boards. Settings are: OFF AutoSet 1 ON AutoSet 2
7	4-Channel-to-2-Channel Conversion. When enabled, causes a 4-channel AutoSet to operate like a 2-channel unit. Settings are: OFF Conversion disabled (Default). ON Conversion enabled. 4-channel AutoSet operates like a 2-channel unit.
8	Unused

Table A-6. Percent High Tolerance Selector (S107) Settings

Numeric Setting on Dial	High Tolerance Percent
1	2%
2	5%
3	10%
4	15%
5	20%
6	25%
7	35%
8	50%
9	100%
0	Disable setpoints *

* When setpoints are disabled, AutoSet stops the press only when the load exceeds 120% of the full-scale tonnage.

Table A-7. Percent Repeatability Selector (S106) Settings

Numeric Setting on Dial	Repeatability Percent
1	1%
2	2%
3	3%
4	5%
5	7%
6	10%
7	15%
8	25%
9	50%
0	Disable setpoints *

* When setpoints are disabled, AutoSet stops the the press only when the load exceeds 120% of the full-scale tonnage.

Glossary

NOTICE

Cross-references to other glossary entries are shown in *italics.*

high setpoint	The tonnage limit above which AutoSet generates a high tonnage fault, stopping the press and displaying a fault message. To calculate the high setpoint, AutoSet multiplies the percent high tolerance set on the AutoSet processor board 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, AutoSet should read 40 tons when 40 tons is applied to the load cells and 80 tons when 80 tons is applied.
nuisance stop	A press shutdown initiated by AutoSet 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 AutoSet during the sample period.
repeatability setpoint	The limit in tonnage variation from one stroke to the next above which AutoSet generates a repeatability fault, stopping the press and displaying a fault message. AutoSet calculates the repeatability setpoint by multiplying the percent repeatability tolerance set on the AutoSet processor board by the *reference tonnage*.
sample period	The number of strokes during which AutoSet collects and measures press tonnage in order to calculate high tonnage and repeatability setpoints. AutoSet calculates setpoints using the highest tonnage measured during the sample period as the reference tonnage.
tonnage fault	A press shutdown initiated by AutoSet 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 AutoSet from registering tonnage events within the zero cam window. Zero cam ensures that AutoSet records only tonnage that occurs at the bottom of the stroke.

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Wintriss Manuals

Wintriss Product	Installation Manual Doc. No.	User Manual/CD Doc. No.
AutoSet (1500, 1500 Plus, 1504, 1504 Plus)	DA71747	DA71447
AutoSetPAC (Tonnage Monitor)	DA71413	DA71443
Die Protection Handbook	N.A. *	1130300 *
DiPro 1500	DA71428	DA71447
DSI 2 Sensor Interface	N.A. *	DA66970 *
LETS Machine Interface (LMI)	N.A. **	DA71974 **
MultiPAC Types 1 and 2	DA71409	DA71443
MultiPAC Types 4 and 5	DA71410	DA71443
ProCam 1500	DA71430	DA71447
ProPAC (Process Monitor-In-die Measurement)	DA71411	DA71443
RamPAC (Shut Height, Counterbalance & Cushion Control)	DA71412	DA71443
Servofeed Interface-Coe/Wintriss	DA71415	DA71443
Servofeed Interface-CWP/Wintriss	DA71416	DA71443
Servofeed Interface-DiPro	DA71429	DA71447
Servofeed Interface-Electrocraft/Wintriss	DA71417	DA71443
Servofeed Interface-Indramat/Wintriss	DA71418	DA71443
Servofeed Interface-ProCam	DA71431	DA71447
Servofeed Interface-SmartPAC	DA71420	DA71443
Servofeed Interface-Waddington/Wintriss	DA71419	DA71443
SFC Machine Interface (SMI)	N.A. **	1140800**
Shadow 8 Safety Light Curtain	N. A. *	1139300 *
Shadow V Safety Light Curtain	DA71433	DA71449
Shadow VI Safety Light Curtain	DA71422	DA71445
Shadow VII Safety Light Curtain	N. A. *	1129400 *
SmartPAC (w/ DiProPAC & ProCamPAC)	DA71439	DA71454
SmartPAC 2 (w/ DiProPAC & ProCamPAC)	DA71406	DA71441
SmartPAC 2 Hydraulic	DA71436	DA71451
SmartPAC 2 Servo	DA71437	DA71452
SmartPAC 2 w/ WPC 2000 Integration	DA71407	DA71442
SmartPAC 2 w/WPC 2000 Run Mode (Spanish)	N. A. *	DA71443
SmartPAC Hydraulic	DA71435	DA71451
SmartPAC Run Mode (Spanish)	N. A. *	DA71443 *
SmartPAC w/ WPC II Integration	DA71440	DA71455
WaveFormPAC (Advanced Load Analyzer)	DA71414	DA71443
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Wintriss Clock Display	N. A. *	DA67206 *
WPC 1000 Wintriss Press Control	DA71423	DA71446
WPC 2000 Option 2	DA71408	DA71442
WPC 2000 Wintriss Press Control	DA71421	DA71444
WPC II Wintriss Press Control	DA71438	DA71453

* Installation Manual not available; User Manual available in hard copy only. Die Protection Handbook available in hard copy (1102400) and on CD (1130300).

** Installation Manual not available. User Manual available for downloading.