WINTRISS®

User Manual

Wintriss® Brake Monitor

Stopping Performance Monitor
1096400
Rev. D October 2014

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

WINTRISS®

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Requirements you must meet when installing and using the Wintriss Brake Monitor

The Wintriss Brake Monitor is designed solely for monitoring the brake or other mechanism that stops the machine. Before installing or using the Wintriss Brake Monitor, be sure that you understand and follow these requirements:

- All metal stamping presses on which the Wintriss Brake Monitor is used must meet the requirements of OSHA regulation 1910.217 and ANSI B11.1-2009. All inspection procedures in 1910.27 must be followed and all presses must be maintained as stated in the regulations. Wintriss takes no responsibility in cases where stopping mechanisms of machinery or other devices are not maintained or do not meet their applicable regulations or standards.
- If the brake or other mechanism that stops the machine is not working properly, the machine may not stop safely even though the Wintriss Brake Monitor is working properly. Wintriss takes no responsibility for improper machine operation in cases where the appropriate machine stopping mechanisms are not working properly.
- The Wintriss Brake Monitor must be installed by qualified personnel.
- Point of operation safeguarding, the single most important factor in the elimination of injuries, can only be determined by the press user. All applicable OSHA and ANSI regulations for safeguarding press systems must be followed when installing and operating the Wintriss Brake Monitor. The two-hand control, light curtain, and/or type-B gate must be installed at the correct safety distance as defined in the OSHA and ANSI regulations, and additional safeguarding devices may be needed to ensure operator safety. The Wintriss Brake Monitor is not in itself a safeguarding device. Wintriss takes no responsibility for injury if the proper safeguarding devices are not installed or working properly.
- Wintriss further takes no responsibility for operator injury if the proper safety procedures are not followed during installation or operation of the Wintriss Brake Monitor.
- Before making any wiring connections to the Wintriss Brake Monitor, all power to the machinery must be off. This includes power to the machine control and motor. Make sure that power is off at the point where wiring for the Wintriss Brake Monitor is connected.
- Once the Wintriss Brake Monitor is installed, all checkout procedures in this manual must be performed. Any problems detected must be corrected before use. Wintriss takes no responsibility in cases where the checkout procedures listed in this manual have not been followed prior to use.
- Only the procedures and repairs listed in the manual should be performed on the Wintriss Brake Monitor. Tests and repairs must be performed by qualified personnel. Wintriss takes no responsibility for improper operation if any other repairs or modifications are made.
- Make sure that supervisors, die-setters, maintenance personnel, machine operators, and foremen have read and understand all instructions pertaining to the use of the Wintriss Brake Monitor.
- All procedures in this manual must be followed for proper Wintriss Brake Monitor operation. Wintriss takes no responsibility for operation if you do not follow the procedures and comply with warning statements in this manual.

The enforcement of the above requirements is beyond Wintriss's ability to control. For proper Wintriss Brake Monitor operation, it is your responsibility to follow these requirements and any other requirements and procedures which may be specific to your machinery.

Changes for Revision D of the Wintriss Brake Monitor User Manual (1096400)

This revision of the Wintriss Brake Monitor User Manual covers all Wintriss Brake Monitor models. It includes the following changes:

- Added to the cover of the installation manual the URL and QR code user needs to download the user manual

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

- **Technical Assistance**

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

- **Return Authorization**

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

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

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

- **Expedited Repair Program**

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

- **Board Exchange Program**

  If your needs are urgent, you can take advantage of our Board Exchange (EX) program. Call our "800" number between 8 a.m. to 5 p.m. EST and we will send a replacement to you overnight. A fee does apply to this service. Contact Wintriss Technical Support at 800-586-8324 for details.

- **Service Center**

  Our Service Center for product service is located at our headquarters in Acton, MA. If your equipment requires repair, please contact us at 800-586-8324 to obtain a return authorization number.

  Nationwide field service is also available. Contact the Wintriss Technical Support group at 800-586-8324.

- **Product Training**

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

- **Restocking Charge**

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

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

Table of Contents

How to use the manual

This is the installation and user reference manual for Wintriss Brake Monitor. It has information about how to install and operate Wintriss Brake Monitor.

Chapter 1 introduces you to Wintriss Brake Monitor, lists its features, and explains key terms required to use it.

Chapter 2 is the installation chapter. Use it to install Wintriss Brake Monitor if you are installing it yourself.

Chapter 3 is the operations chapter. It explains how to use Wintriss Brake Monitor. Use it to look up things you need to know when you are running the press.

Chapter 4 shows you error codes you may see on your LED display when it sends a stop command to the press or when there is an equipment problem. What the error code means and how to correct the problem is explained. Use this chapter to learn about all the Wintriss Brake Monitor's fault conditions.

Appendixes A and B detail the OSHA and ANSI regulations, respectively, as they pertain to brake monitoring and safety.

Appendix C explains how to install Wintriss Brake Monitor if you have a panel mount.

A wiring diagram is provided at the back of the manual.

Warranty

Wintriss Controls warrants that Wintriss electronic controls are free from defects in material and workmanship under normal use and service for a period of one year (two years for Shadow light curtains) from date of shipment. All software products (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.

Please note:

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

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WINTRISS BRAKE MONITOR
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Chapter 1
Introduction to Wintriss Brake Monitor

What is Wintriss Brake Monitor

Wintriss Brake Monitor is an easy-to-use, micro-processor-based brake monitoring system. As a stopping-performance monitor, Wintriss Brake Monitor is control reliable and meets or exceeds ANSI B11.1-2009 and OSHA 1910.217 regulations. ANSI B11.1-2009 requires that any press that has a single-stroke mode and uses either a two-hand control, a light curtain, or a type-B movable barrier as a safeguard, must have a brake monitor. The OSHA and ANSI regulations are explained in detail in Appendixes A and B, respectively.

You can use Wintriss Brake Monitor to perform a 90° stop-time test, which is designed to be done at the worst possible point in the stroke to stop (at 90°). This test is required in order to set the correct safety distance for personnel guarding devices.

Wintriss Brake Monitor comes with a resolver, which can be shared with all other Wintriss resolver-based products. Wintriss Brake Monitor has a highly visible digital readout which shows key information about the press operation. And its crank angle clock dynamically indicates the location of the crankshaft, whether the press is running or at rest. (see Figure 1-1 for an illustration of the front panel) Wintriss Brake Monitor also displays the stopping angle, very important when you are trying to determine the critical angle for your die protection system.

Wintriss Brake Monitor also shows the stopping time of the press. When the actual stopping time is within ten milliseconds of the stop time limit set, an amber "brake warning" LED is clearly illuminated, to indicate that it is time to do maintenance on your brake. When the stop time limit has been exceeded, Wintriss Brake Monitor does not allow the press to be re-started. *You must overhaul the brake in order to continue normal operation of the press.*

Whenever error conditions occur, the Wintriss Brake Monitor displays a two-digit error number, preceded by the letter "E". (These error codes are explained in detail in Chapter 4 "Wintriss Brake Monitor Alarms & Troubleshooting".)

Wintriss Brake Monitor Front Panel

LED display

Three-digit display which shows press speed (SPM) when the press is running. When the press stops, the display shows the angle of the stroke in degrees where the press stopped. For instance, it would show 0° for top dead center. Other items that can also be selected for viewing.

Display indicators

Six lamps which correspond to items for viewing on the LED display. To make the selection, depress the Reset/Select button. The illuminated lamp will scroll from one selection to the next, and the corresponding value will appear on the LED display.

Reset/Select button

Allows you to clear errors, and under normal operating conditions allows you to select items for viewing on the LED display.

Crank-angle clock

Series of LEDs in the shape of a circle that dynamically display the approximate location of the crank shaft whether the press is running or at rest. Each of the LEDs in the clock is equivalent to approximately 11 degrees.

Brake Warning LED

Amber-colored indicator that illuminates when the stopping time of the press is within 10 milliseconds of the preset stop time limit. When the brake warning light comes on, the press will still operate normally, but it is time to schedule maintenance on the brake. The light can only be turned off by turning power to the unit OFF, then back ON.

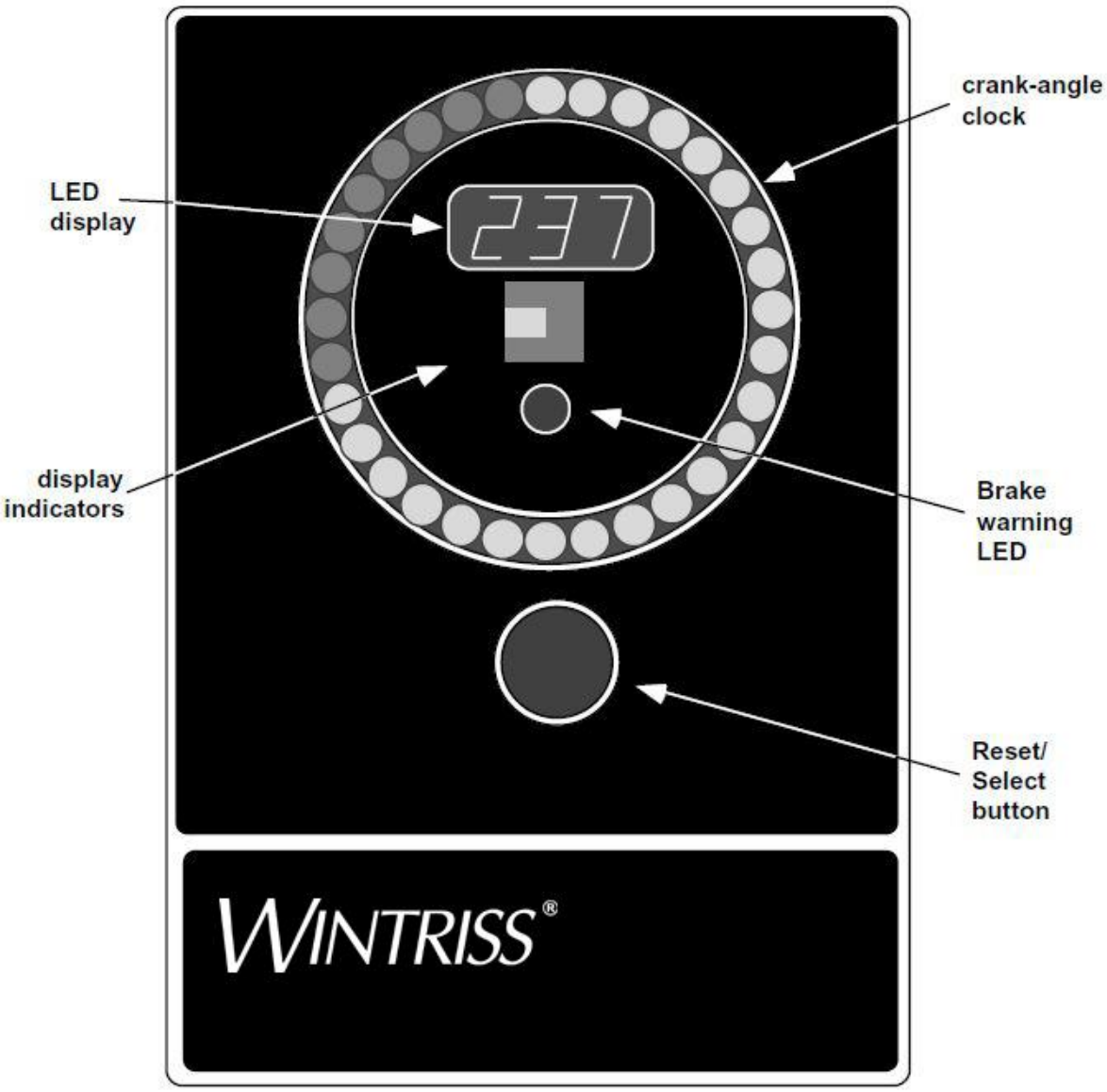


Figure 1-1. Illustration of Wintriss Brake Monitor

How Wintriss Brake Monitor Works

Wintriss Brake Monitor checks for brake wear

Wintriss Brake Monitor constantly checks brake wear by measuring the amount of time it takes to stop the press. The brake monitor measures how long it takes from the time that the dual safety valve is de-energized to the actual stopping of the press crankshaft. Wintriss Brake Monitor then displays this value in milliseconds.

Wintriss Brake Monitor accurately monitors the stopping time of the press every time that the press stops. On each stop, Wintriss Brake Monitor determines if the stopping time is within the preset stop time limit. The amber-colored Brake Warning LED illuminates when the stopping time is within 10 milliseconds of the stop time limit to alert maintenance to perform the necessary repairs on the brake. Should the actual stopping time be outside the safety range, Wintriss Brake Monitor immediately inhibits the press from further operation, and flashes the out-of-limit stop time value on its three-digit LED display. You cannot run the press until the situation has been corrected.

The resolver lets Wintriss Brake Monitor know where the crankshaft is

A key element of Wintriss Brake Monitor operation is that it always knows the position of the crankshaft during the stroke. Wintriss Brake Monitor is connected to a resolver mounted on the press which turns one to one (1:1) with the crankshaft. The resolver is similar to an electrical generator. It has several windings inside and works on the principle of inductance. The resolver has two outputs. As the resolver turns the amplitude and the phase of the two outputs varies, these signals are interpreted by Wintriss Brake Monitor's electronics to determine the correct angle. Thus, the purpose of the resolver is to tell Wintriss Brake Monitor where the crankshaft is at every point in the stroke.

Wintriss Brake Monitor converts the resolver signal to the crank angle

Wintriss Brake Monitor's electronics convert the analog signal from the resolver at any point in its rotation to a number. This number is the position of the resolver (and press crankshaft) in degrees.

Wintriss Brake Monitor provides useful information

With Wintriss Brake Monitor, you can view useful information, including stopping angle and 90° stop-time test result. You can use the stopping angle information to determine the critical angle for your die protection system. And you can use the results of the 90° stop-time test to properly set the correct safety distance for personnel guarding devices system.

Specifications

Enclosure	•	7" x 9" x 3.5" (17.78 x 22.86 x 8.89 cm),shock mounted. Panel mount option: 7.5" x 10" x 4" (19.05 x 25.4 x 10.2 cm)
Electrical	•	Input: 120/240 Vac 50/60 Hz, 15 VA
	•	Input check circuit: 12-250Vac or DC
Operating Speed	•	7-2000 SPM
Memory	•	Executive program—EPROM
	•	Settings - EEPROM
Inputs	•	Inputs for resolver, input check circuit, remote reset input
Outputs	•	Emergency stop: ratings 0-4A resistive @ 240V max (AC or DC)
Equipment	•	Resolver: 0.75" (1.9 cm) keyed shaft, rated shaft loading: 200 lb axial, 200 lb radial

Chapter 2
Installing Wintriss Brake Monitor

This chapter describes how to install Wintriss Brake Monitor. It covers:

- Installation guidelines and overview
- Preparation for mounting Wintriss Brake Monitor
- Mounting the resolver (plus multiple controls connected to one resolver)
- Connecting AC power, E-stop circuits and input check circuit
- Power-up pre-checks and turning power on
- Zeroing the resolver
- Installing high speed version of Wintriss Brake Monitor (optional)
- Final checkout

WARNING
PREVENT SHOCK

Disconnect main power before installation. All power to the press, press control, and other equipment used with the press must be off during installation. Installation must be performed by qualified personnel only.

Before You Start

If you plan to install Wintriss Brake Monitor yourself instead of leaving the job to Wintriss service personnel, read this installation chapter entirely before you start. Find out what is required and plan your steps before taking any action. Wintriss Brake Monitor is not hard to install. But, like anything else, when you are working with something new, the best way to proceed is to learn all you can about it first *before* cutting wires, drilling holes, and running conduit.

You will need to use the display during installation to zero the resolver. Before you start installation, you should have a good basic knowledge of how to use the Wintriss Brake Monitor switches and display in order to make settings. This will speed things along.

If you run into any problems installing Wintriss Brake Monitor, remember that Wintriss Tech. Support is standing by to help you. Just call the toll-free number in the front of the manual.

Installation Guidelines

These guidelines cover major points that are important for proper Wintriss Brake Monitor operation. By following these guidelines, you will eliminate problems that could occur later. The points below are addressed again in the installation procedures.

WARNING
ELECTRICAL SHOCK

Disconnect main power before installation. All power to the press, press control, and other equipment used with the press must be off during installation. Installation must be performed by qualified personnel only.

- Never run wires for 120V and for lower voltages (such as 5V or 24V) inside the same conduit. Run flexible, liquid-tight conduit for high voltage lines (120V power, input check circuit, relay circuits) to the upper right-hand corner of Wintriss Brake Monitor. *Be sure to follow local electrical codes.* Run one or two low voltage conduits into the bottom of Wintriss Brake Monitor for the resolver wires and remote reset (optional). Because Wintriss Brake Monitor 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 with the enclosure.
- The AC power supply wires to Wintriss Brake Monitor should be run separately from any DC control wires. Never use the Wintriss Brake Monitor power terminals as a junction point to provide power for other devices. In most cases, the AC power supply wires should be connected directly to the press control transformer at the press control.
- Good grounds at Wintriss Brake Monitor are important. Make sure Wintriss Brake Monitor is properly grounded (see Figure 2-1).
- The ground wire from Wintriss Brake Monitor should be connected to the main ground point of the press control. This may be in the area where the control transformer is grounded. Finding a good place for a ground is sometimes difficult, but it should be close to where the press control receives its ground.

Overview of the Installation

Figure 2-1 shows Wintriss Brake Monitor installed on a press. Study the drawing to get a general idea of what you have and what you will need to do. Of course, where you put the components (resolver, the Wintriss Brake Monitor, etc.) will probably be different for your installation. Your exact wiring scheme may also be different (where you connect AC power, stop circuits, etc.). However, in general, this is what your installation should look like when done.

The drawing also shows how to properly run your wiring based upon the previous guidelines. If you have top stop and emergency stop circuits that are 24V or other voltage besides 120V, you must run them separately.

The First Step—Checking the Press

Before starting the installation, check all modes of press operation. Run the press in INCH, SINGLE STROKE, and CONTINUOUS modes. Make sure the press has working emergency stop circuits. Verification that the press operates and stops properly is extremely important because Wintriss Brake Monitor will be tied in to the press stop circuits. Do not forget to mark your electrical prints where you wire in Wintriss Brake Monitor.

WARNING

Point of operation guarding can only be determined by the press user. All applicable OSHA and ANSI regulations for safeguarding press systems must be followed when installing and operating Wintriss Brake Monitor. The two-hand control, light curtain, and/or type-B gate must be installed at the correct safety distance as defined in the OSHA and ANSI regulations, and additional safeguarding devices may be needed to ensure operator safety. Wintriss Brake Monitor is not in itself a safeguarding device. Wintriss takes no responsibility for injury if the proper safeguarding devices are not installed or working properly.

Set press to top of stroke (TDC)

Set the press ram to top dead center (TDC).

PRESS MUST BE AT TDC!

This is an important step because the press must be at top dead center (TDC) when you make final adjustments for the resolver. Be accurate when setting the press to TDC. Set to 0° ±2°. *Use a dial indicator on the face of the ram if necessary*.

Preparation for Mounting Wintriss Brake Monitor

To mount Wintriss Brake Monitor, follow these steps:

1. Determine a convenient place to mount Wintriss Brake Monitor. Ideally it should be close to the press control so operators and setup personnel can easily see the readouts. The enclosure can be mounted to the press, on a free-standing pedestal, or on a pendant.
2. Drill four holes for mounting, and tap, if necessary. Shockmount studs are 1/4-20. Mount the enclosure using the enclosed shock mounts and mounting flanges. Use a No. 7 drill and 1/4-20 tap. Refer to the drawings in Figure 2-2 for mounting dimensions.

PLACE WINTRISS BRAKE MONITOR AT A CONVENIENT LOCATION

Wintriss Brake Monitor should be installed at a convenient location for all users. An ideal location would be where it is clearly visible for the press operators and set-up personnel to see the LED display and crank-angle clock, and where the Reset/Select button can easily be accessed. Experiment to determine a good spot for everybody prior to wiring and mounting.

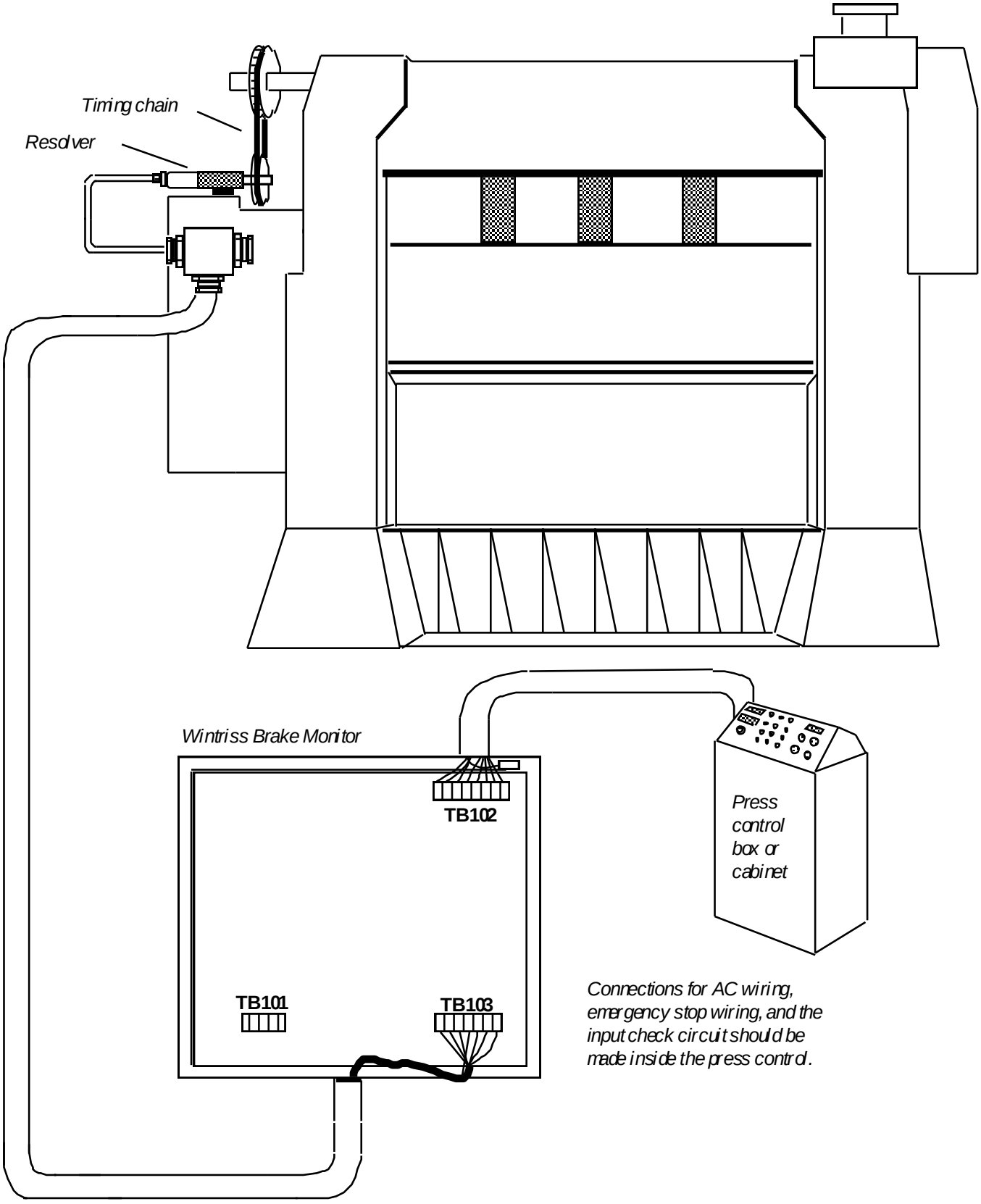


Figure 2-1. Wintriss Brake Monitor installation overview

Figure 2-2. Wintriss Brake Monitor mounting dimensions

Mounting the Resolver

The resolver must be driven smoothly at a 1:1 ratio with the crankshaft of the press. The resolver signals Wintriss Brake Monitor the exact position of the crankshaft at every degree of the stroke (see "How Wintriss Brake Monitor works" in Chapter 1). Design a method of driving the resolver directly from the crankshaft using a chain or timing belt (not a V belt) and sprockets. Use either an idler sprocket or spring loaded resolver base to compensate for slack or stretch. Wintriss stocks a spring loaded base with a hole pattern to match the resolver. It does not matter which way the resolver turns. You can switch two wires on the resolver connector to set the direction of rotation.

The drive you choose must also allow for adjustment of the resolver to its zero position at top dead center. All sprockets must be keyed or pinned. The resolver shaft has a standard 3/16 keyway.

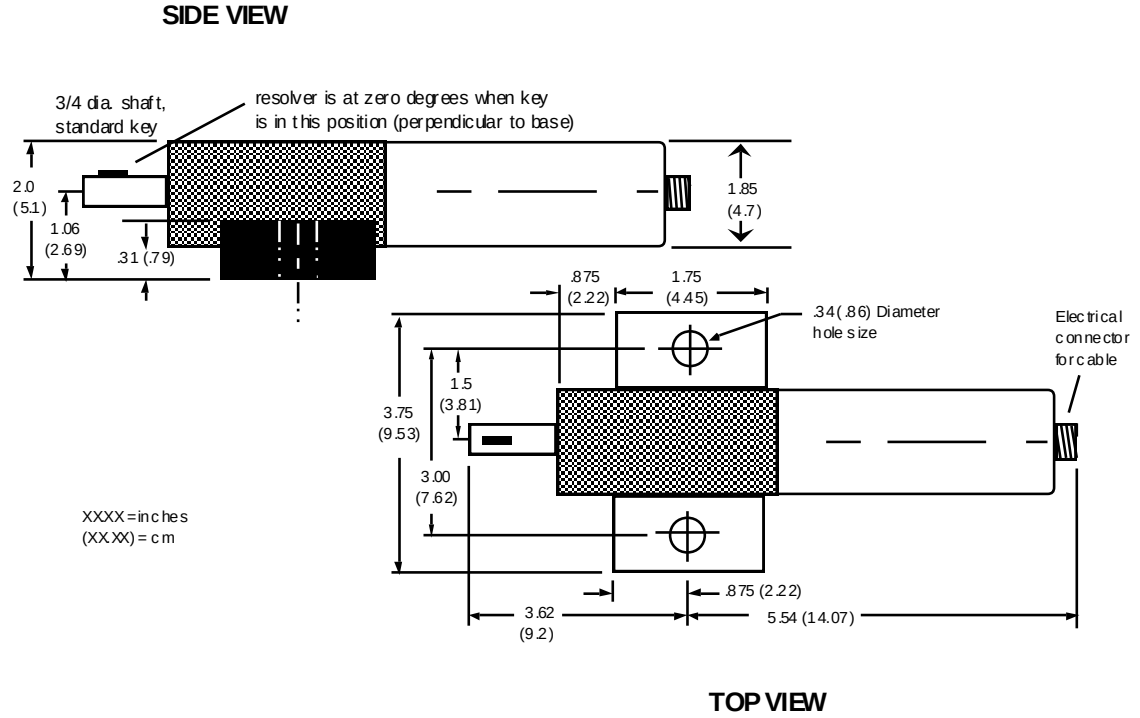


Figure 2-3. Resolver (reflects dimensions with military-style connector)

When designing the drive for the resolver, here is what you should *not* do:

1. Do not use a long, sloppy chain.
2. Do not use gears, right angle joints, shafts with universal joints because these will develop too much backlash or too much play.
3. Do not try direct coupling to the crank because this requires extreme precision. If the resolver is only slightly off-center, the resolver bearing will be subjected to side loads well in excess of its rated capacity and will ultimately fail.
4. Do not use flexible couplings (can be inaccurate) or V belts (inaccurate, will slip).
5. Do not use a flexible shaft like a speedometer cable. The resolver will lag the crank because the shaft twists on start-up. When the crank stops, the resolver will turn past the true stopping point and snap backward.

Install and wire resolver

Once you have thought out your design and gathered the parts, mount the resolver by bolting it to the press or other platform at the spot you selected. Install your drive mechanism. It does not matter which way the resolver turns. You will set the direction of rotation when you wire it. You will also electronically zero the resolver later. Set the resolver as close to zero as you can by turning the shaft so the keyway is aligned with the arrow on the housing. See Figure 2-3. *The press should be at top dead center when you do this.* Turn the shaft before attaching the chain or other drive mechanism.

1. Find the resolver cable (if not connected to the resolver). Plug the end with the molded connector into the resolver (it only goes one way). Twist the locknut so the connection is tight.

2. Run the resolver cable through 1/2" conduit from the resolver to the bottom right of Wintriss Brake Monitor.

3. See Figure 2-4 for the location of the resolver connector TB103. Measure the resolver wires to fit and cut the wires.

4. Notice the connector for the resolver wires is plugged into TB103. Pull this L-shaped connector out of its socket.

5. Attach the wires to the L-shaped connector as shown in Figure 2-5. Make sure you connect the black and yellow wires correctly based upon the way your resolver will rotate—clockwise or counterclockwise. To connect a wire, find the correct terminal and loosen the screw over it by turning it counterclockwise (see Figure 2-6). Strip the correct wire for this terminal 1/4" (6.4 mm) from end. Insert bare wire into the terminal 90% of the way. Tighten the screw. The metal tooth inside the terminal will clamp down on the bare wire for a tight connection. Make sure that the metal tooth is clamped down on the bare part of the wire, not on the insulation.

   NOTE: *The connector can only plug in one way. Make sure you do not start at the wrong end when connecting wires. Put the connector over the base the way it will plug in and note the wire marking next to the base before starting.*

6. Connect all wires and double check connections when done. Plug the L-shaped top firmly into base. It only can go one way.

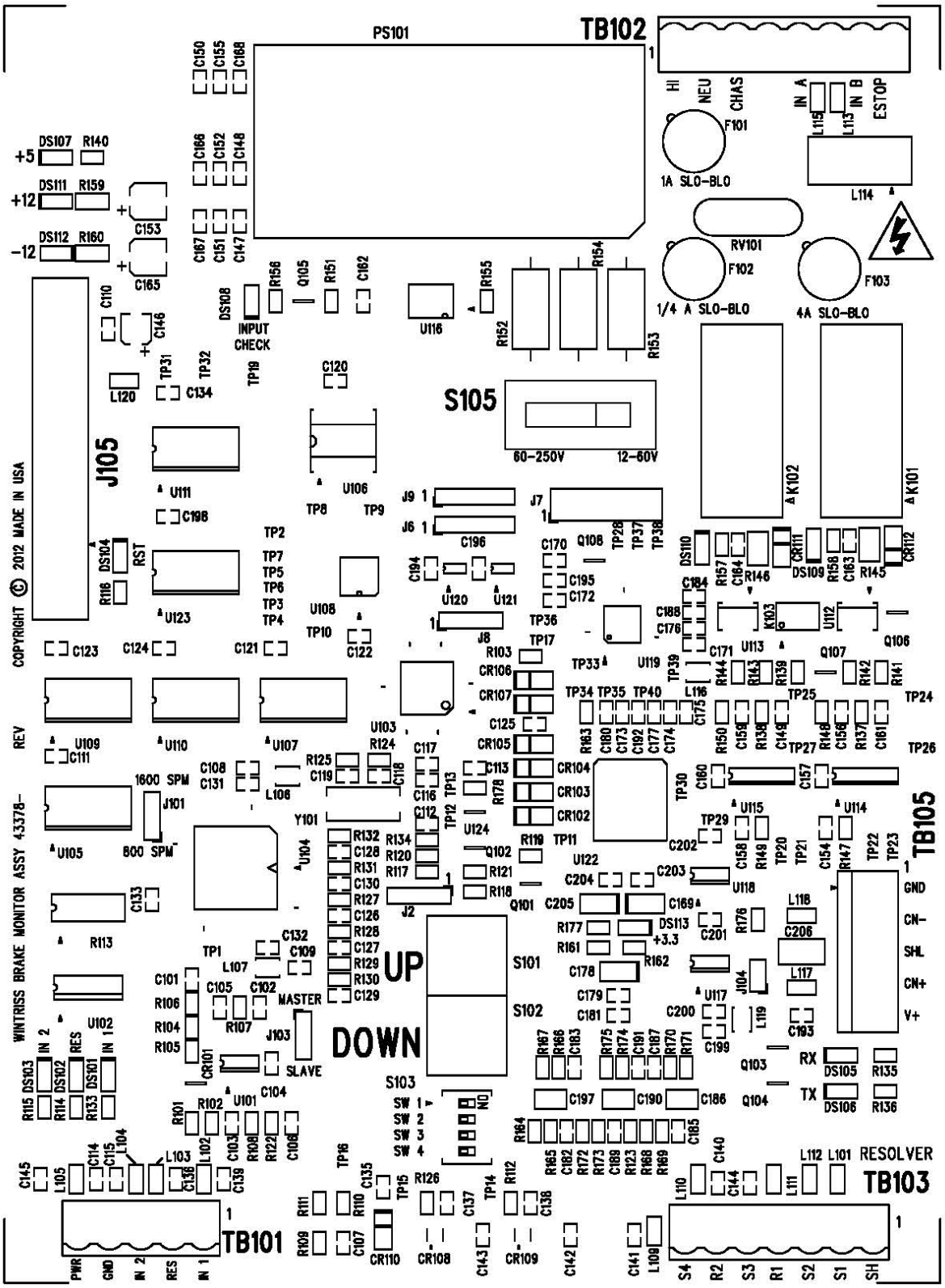


Figure 2-4. Location of components

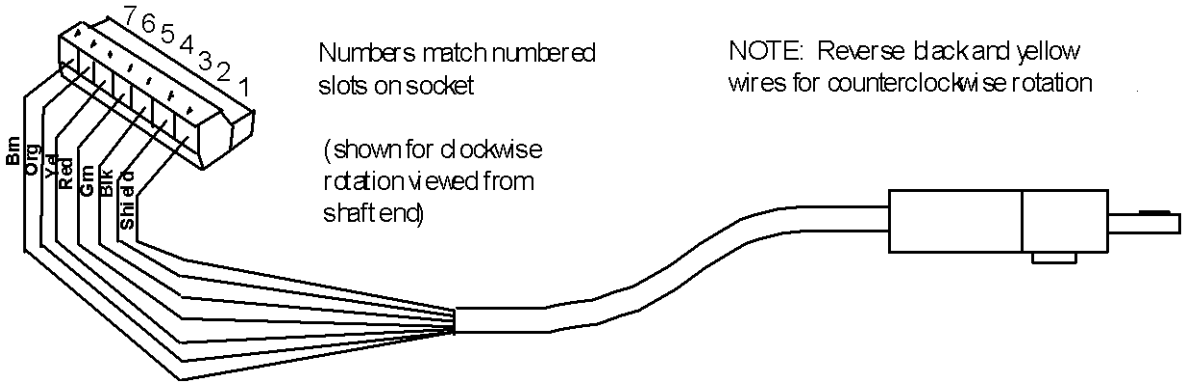


Figure 2-5. Wiring for resolver cable (see table below)

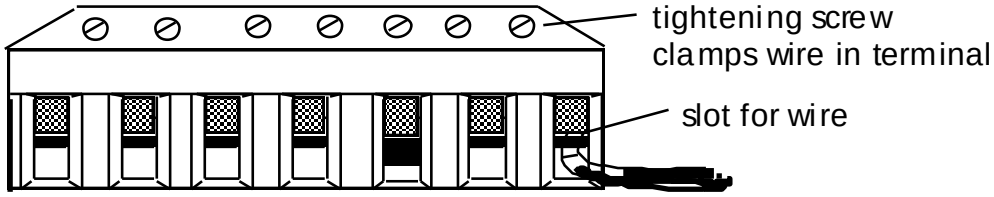


Figure 2-6. Attaching wires to connector

Resolver Wiring Table

Pin #	Wire Color
1	Shield
2	Black
3	Green
4	Red
5	Yellow
6	Orange
7	Brown

Multiple Controls Connected to a Single Resolver

You can connect Wintriss Brake Monitor's resolver to as many as three other controls (for instance - DiPro 1500).

> ***IMPORTANT!***
> *When Wintriss Brake Monitor and DiPro 1500 are sharing the resolver, Wintriss Brake Monitor must be the MASTER.*

1. See Figure 2-4 for the location of the resolver connector TB103 and the jumper J103.
2. Locate the 6-conductor shielded resolver cable. Run the cable through 1/2" conduit from TB103 to the bottom right knockout of the "master" unit. If there is a connector on the other end, cut it off.
3. Pull connector* in the "master" unit (*TB103 if Wintriss Brake Monitor; TB105 if ProCam 1500 or DiPro 1500) out of its socket.
4. Attach the wires to the connector as shown in Figure 2-5. You will be wiring in parallel (#4 red to red, #5 yellow to yellow, etc.), so that when you are finished, you should have two wires of the same color connected to each terminal on TB105 (DiPro 1500 or ProCam 1500) or TB103 (Wintriss Brake Monitor). To connect a wire, refer to step 5 in "To wire the resolver". Also see Figure 2-6.
5. Connect the cable from the "master" unit to the first "slave" unit. Remember to wire in parallel. If there is an additional "slave" unit, again wire in parallel.
6. See that the jumper J103 on the control board of the "master" unit is set so that it is on pins 1 and 2, "master" position. Locate J103 on the control board of the other "slave" units. Move each of those jumpers to pins 2 and 3, "slave".

Wiring a Remote Reset Switch

The remote reset switch can be used to clear error codes only that appear on the LED display. This optional switch cannot be used to select items to view on the display.

To connect a remote reset switch

Connector TB101 has two terminals for wiring a remote reset switch**.** The remote reset terminal can be wired to the equipment that you choose, or you can just use a simple switch to activate the circuit.

Connect a wire from TB101, terminal 2, to a normally open switch. Connect another wire from the switch to GND (TB101, terminal 6). Wintriss Brake Monitor is reset with a momentary connection to ground.

Connecting AC Wiring, Stop Circuits, and Input Check Circuit

All wires can be run through a flexible liquid-tight conduit to the control as long as all circuits are 115V. If your top stop circuits and emergency stop circuits are low voltage circuits (for example, 24V), run two conduits—one for 115V wires and one for 24V wires.

Bring the wiring connections for AC power, for the emergency stop circuits, and for the input check circuit to a convenient point so that you can tie them to the appropriate connector. No. 16 wire is recommended for these circuits (No. 14, if local codes require it).

To wire the connector, follow these steps.

1. Look inside the unit. Near the top, you will see a metal cover. This cover protects the power supply. Loosen the three screws on top and remove the cover. You will see the connector for AC power and the stop circuit at right (TB102).

> **WARNING**
> **SHOCK HAZARD**
> Never apply power to Wintriss Brake Monitor when the power supply cover is removed. To prevent shock, always replace the cover before applying power.

2. Determine how you will bring wiring from your 115 Vac power source (or 230V source if applicable) to the unit. These wires should be connected directly to the press control transformer at the press control. For 115 Vac, you need three wires—high (red), neutral (white) and ground (green). For 230 Vac, wires are black and red with green or green/yellow for ground.

3. Determine how you will connect the wires from Wintriss Brake Monitor to your press control emergency stop circuit. You can wire these circuits at your press control. Refer to your press control manual or other electrical prints. You need two wires for the emergency stop circuit. Make sure that the emergency stop circuit is active in all modes of operation including Inch, Single-stroke and Continuous, if available.

4. Determine how you will connect wires to the input check circuit (terminals marked "IN A" and "IN B.") You need two wires. These inputs must be in parallel with one of the coils of the dual safety valve that controls the clutch/brake. When the clutch is engaged, 12–250 Vac or Vdc (50-60 Hz) must be present across terminals A and B. See Figure 2-7. The connection can be made inside the press control where the circuits to the valve relays are wired in. Refer to your press control manual and electrical prints. It does not matter which wire goes to which terminal on the connector.
   a. <u>For applications where voltage is 60-250 V</u>: Set switch S105 to the left. This is the factory setting.
   b. <u>For applications where dual safety valve coil voltage is 12-60 Vac or Vdc</u>: Set switch S105 to the right. The switch is marked 12-60 V. *(This switch is located at the upper right-hand portion of the board. See Figure 2-4 for location of switch. See Figure 2-8 for illustration.)*

HOW THE INPUT CHECK CIRCUIT DETECTS RESOLVER CHAIN BREAKAGE

When the dual safety valve relay is energized by the press control to start the press, voltage will be produced in the input check circuit. This signals Wintriss Brake Monitor that the press ram should begin to move. If Wintriss Brake Monitor gets no signals from the resolver within a short period of time (resolver not turning), it opens the emergency stop circuit. A "loss of rotation" error code ("E03") appears on the LED display. The press could have started but the resolver belt or chain broke or was significantly too loose so that the resolver shaft did not move. Other possible reasons for the fault could be low air pressure to the clutch or a bad clutch.

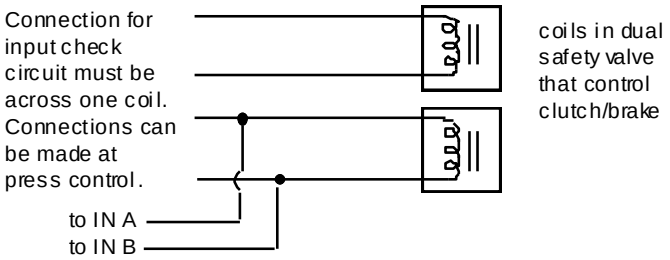


Figure 2-7. Schematic of input check circuit

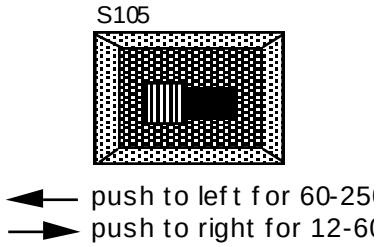


Figure 2-8. Input check switch (S105)

6. Run the power, stop circuit, and input check circuit wires to Wintriss Brake Monitor through flexible liquid-tight conduit to the enclosure. Because Wintriss Brake Monitor 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 with the enclosure.

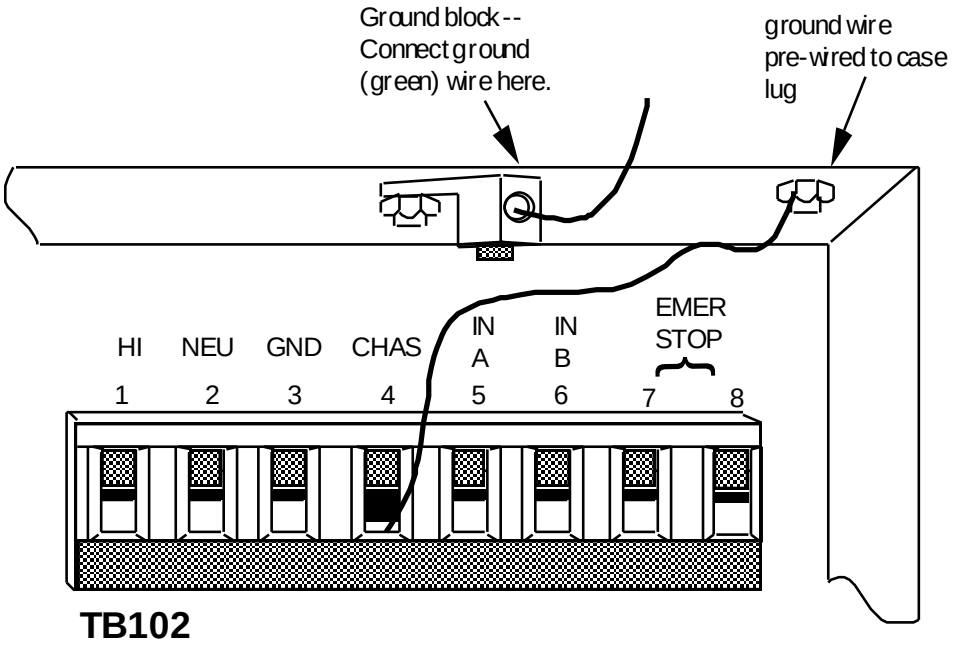


Figure 2-9. Wintriss Brake Monitor ground connections

Connections and ground block for AC power. Also on connector are terminals for input module and emergency stop circuits.

7. To make ground connections: Refer to Figure 2-9. Your ground (green or green/yellow) wire must be connected to the ground block, not to "GND". The ground block is located on the wall of the unit just above the connector as shown. To connect to the ground block, strip the ground wire about 1/4" (6.4 mm) from end, loosen screw on block, slide wire in hole, and tighten screw to pin wire in place. A ground wire is attached from the connector to a case lug. Leave the ground wire attached to the connector while making connections. *If you remove this wire in order to pull the connector all the way out of the unit, be sure to replace it when done.*
8. Now find the connector TB102 for the other AC wires and stop circuits. It should be plugged into the socket.
9. Connect power wires as shown in the above illustration. For 115 Vac, connect the red wire to HI terminal and white wire to NEU. (For 230 Vac connect black wire to HI terminal and red wire to NEU). Attach wires the same way that you did for resolver wires. *Make sure that you do not start at the wrong end of the connector. Put it over the socket the way it will plug in, and note wire markings next to the socket before starting.*

10. Connect wires from the press control emergency stop circuit to the terminals marked "EMER STOP" (7 and 8). It does not matter in which order you connect the wires.
11. Connect wires for the input check circuit to the terminals marked "IN A" and "IN B" (5 and 6). It does not matter in which order you connect the wires. See Figure 2-7.
12. Plug connector back into its slot. Double check connections with markings at the connector base to make sure you did not wire it backwards.
13. Connect E-stop and input check circuit wires at the press control or other box into which you are tying them. *Do not connect wires to AC power source until you are done with all other installation procedures.*
14. Make all necessary conduit connections to ensure NEMA 12 protection. Wintriss Brake Monitor is rated NEMA 12 (protected against dust and oil). *Be sure to number all wires in a way consistent with your press's electrical prints.*

WARNING! PREVENT SHOCK
Be sure you replaced the power supply cover. Do not connect AC wires to the power source until all other installation procedures are finished.

Setting the Crank-angle Clock

When you receive your Wintriss Brake Monitor, the crank-angle clock is enabled. In other words, as soon as the unit is powered ON, the illuminated LEDs on the clock face dynamically represent the location of the crankshaft.

If you wish to turn the crank-angle clock OFF while the press is running, it is easy to do. Simply open the unit, and locate switch block S103 (see Figure 2-4 for exact location). With a ball point pen (not a pencil) or your thumbnail, push switch SW3 to the right (away from the OPEN position). Make sure that you push it all the way to the right. Remember that while this disables the LEDs on the clock from illuminating when the press is running, the clock face will be illuminated when the press is stopped. If you wish to completely disable the clock face, push switch SW4 all the way to the right, instead of SW3.

We recommend that you use SW3, rather than SW4. In that way Wintriss Brake Monitor will always indicate the position of crankshaft when the press is stopped.

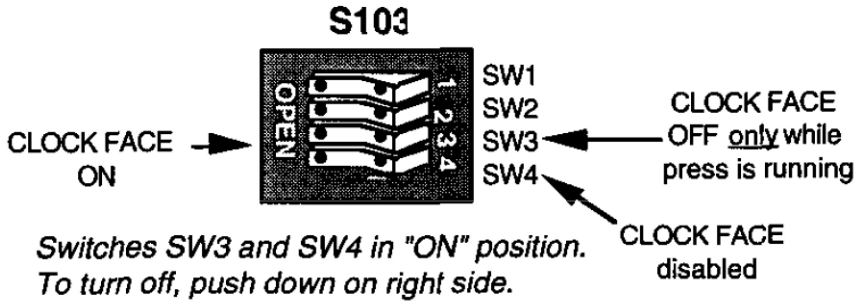


Figure 2-10. Setting clock face at Switch block S103

Installing High Speed Version of Wintriss Brake Monitor (Opt.)

If you have a standard Wintriss Brake Monitor and wish to change the system to a high speed version (2000 SPM maximum), follow these instructions:

Moving the jumper:

1. See Figure 2-4 for the location of the jumper J101. Notice that the jumper is set on pins 2 and 3 (for 1000 SPM).
2. Move the jumper so that it will be on pins 1 and 2 (for 2000 SPM).

Upgrading the firmware:

1. ***Verify that power has been turned off to Wintriss Brake Monitor!*** The LCD displays should not be illuminated.
2. Looking inside Wintriss Brake Monitor, locate the firmware chip at location U106 (see Figure 2-4). Notice that the firmware chip has a label on it.
3. Note the orientation of the firmware chip. There is a semi-circular notch on the left end of the chip. When you replace the chip, the notch on the new chip *MUST* also face left.
4. Insert a small screwdriver between the right end of the chip and the socket and carefully pry the chip out of its socket. Be careful not to get the screwdriver under the socket itself. Put the chip aside.
5. Open the package containing the new firmware chip. Before you remove the chip from the package, you should ground yourself by touching any large metal object (the press will do nicely). This will remove any static electricity that you may be carrying around. A static electricity "zap" will destroy the chip.
6. Once you are "grounded", remove the chip from its holder. *Orient the chip so that the notch faces to the left. If you plug the chip in backwards, it will be destroyed.*
7. Plug the chip into its socket by first plugging in the bottom row of pins and then aligning the top row of pins over the socket and pushing straight in.
8. If the two rows of pins are spread too far apart to plug easily into the socket:
   A. Hold the chip on its side on a desk or a flat surface with the pins pointing towards you.
   B. Being careful NOT to overbend the pins, gently flex the top of the chip towards you. Turn the chip over so that the other row of pins is now on the desk pointing towards you. Flex it again, thus bending the other row of pins towards each other.
   C. Try plugging the chip into the socket again, as in step 7. If necessary, repeat steps 8A and 8B.
9. Make sure that the notch in the chip faces left and that all of the pins are in the socket.
10. Go to the section, "Turn on power to Wintriss Brake Monitor and check LEDs" when you are ready to turn the unit on.

Power-up pre-checks

You are almost ready to turn Wintriss Brake Monitor on. Before continuing, make sure that you have completed all the procedures in this chapter up to this point. Then go through the checklist below to be sure Wintriss Brake Monitor is wired correctly.

Check this item before turning Wintriss Brake Monitor on	
_____	Is the resolver cable wired to the connector correctly. See Figure 2-5.

Everything checked? If so, move on to the next section.

Connect AC power wires to power source

Connect AC power wires from connector TB102 in Wintriss Brake Monitor to the power source. Be sure power is off at the terminals to which you are connecting wires.

Turn on power to Brake Monitor and check LEDs

Turn the power on and verify the normal operation of the unit. If the unit powers up with "rolling" LEDs, turn the power off and refer to the section "Installing high speed version of Wintriss Brake Monitor" to be sure you installed the EPROM properly. Sometimes one or more pins are bent and not plugged in properly. If the unit is still malfunctioning, call Wintriss Tech. Support for assistance.

If the three-digit LED display is blank, there may be a problem with power to Wintriss Brake Monitor. Turn power to Wintriss Brake Monitor off and recheck all power connections. If you still cannot see the display, call Wintriss Tech. Support for assistance.

If you received an error message on your display when you turned power on, first press the Reset/Select button to clear the error message. If the message still appears, go to Chapter 4 in this manual and find the section describing that error message. Follow the instructions there for correcting the problem. If the error message is not described there, or you cannot fix the problem, call Wintriss Tech. Support.

Initializing the system

You can now initialize the system.

1. Set your press at top dead center (TDC). If your press is set at TDC (0° ±2°) before starting the installation and you have not moved the ram, go to the instructions for zeroing. If your press is not set at TDC, you must inch the press to 0°±2°. Use a dial indicator or some other means to determine 0°. The press must be at top dead center. Once you are at 0°, go to the next step.
2. Turn the power OFF to Wintriss Brake Monitor, and open the enclosure.
3. Hold down the "UP" button (S101) *while* you turn the power back ON. (Refer to the Figure 2-4 in Chapter 2 for its exact location, situated at the lower end of the main board.) Once "*Int"* appears on the LED display (Figure 2-11), release the button.

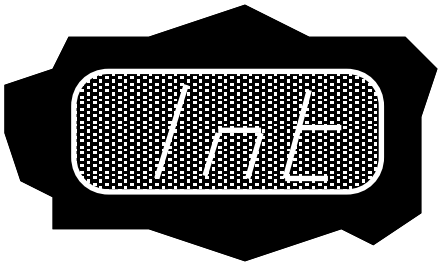


Figure 2-11. *"Int"* appearing on LED display indicating "system initialized"

These are the parameters that have been initialized automatically:

Stop Time Limit: The Stop Time Limit is automatically initialized to 500 milliseconds. When you begin operating your press with Wintriss Brake Monitor, you can adjust this setting to a more suitable number (see Chapter 3).

Start Time Limit: Every press takes a finite amount of time from the point when the dual safety valve (DSV) is energized to when the resolver signal indicates to the brake monitor that it is turning. This elapsed time, primarily taken by the clutch mechanism, is called Start Time. The brake monitor needs an internal limit for the start time to detect resolver drive failure. The *first* time that you start the press, the Start Time Limit is automatically set to 2 times the actual amount of the start time.

Resolver Zero Setting: The resolver is set to zero.

Zeroing the resolver

1. Any time that you want to zero the resolver, follow these steps.
2. Set your press at top dead center (TDC):

   If your press is set at TDC (0° ±2°) before starting the installation and you have not moved the ram, go to the instructions for zeroing.

   If your press is not set at TDC, you must inch the press to 0°±2°. Use a dial indicator or some other means to determine 0°. *The press must be at top dead center.* Once you are at 0°, go to the next step.
3. Turn the power OFF to Wintriss Brake Monitor. Then hold down the Reset/Select button *while* you turn the unit back on. Once "*rES"* appears on the LED display, release the button. The Resolver Zero Correction has been performed (Figure 2-12). In effect, Wintriss Brake Monitor electronically adds or subtracts the offset; so it always knows the true zero position of the ram. If the number is 0, it means the zero position of the resolver at TDC is 0°. When the press is at TDC, the crank angle value in the LED display should read 0°. If not, repeat the zeroing process. The system can only zero the resolver within a ±30° offset.

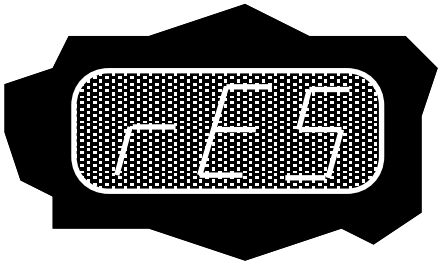


Figure 2-12. *"rES"* appearing on LED display, zeroing resolver

Initializing the Start Time Limit only

1. Any time that you wish to re-initialize the Start Time Limit only, follow these steps.
2. Turn power OFF to the unit. Then turn back ON while pressing the "DOWN" button. This sets the limit to 2 times the actual amount of start time once the press is first started. This value cannot be changed manually. Once "*Str"* appears on the LED display, release the button. (Figure 2-13)

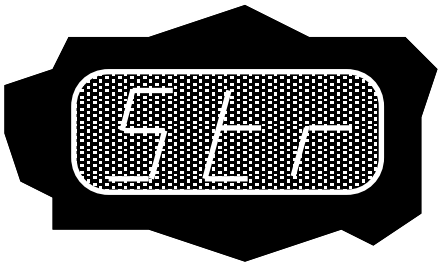


Figure 2-13. *"Str"* appearing on LED display, initializing Start Time Limit

The Start Time Limit value cannot be changed manually.

3. To view the Start Time Limit in milliseconds, select "Stopping Angle" on the LED display (see Chapter 3 if you need assistance). Then open the unit, and press the "DOWN" button that is situated at location S102 on the main board (Figure 2-4).
4. To view the last recorded Start Time reading, select "Stopping Angle" again, but this time press the "UP" button (at S101 on the main board) found inside the unit.

Final checkout

If you have completed all procedures in this chapter, Wintriss Brake Monitor is almost ready to use. All you need to do is to make a few test press runs to ensure that Wintriss Brake Monitor is working properly. Here are the steps for the final checkout:

Check and set direction of the rotation of the resolver: Use the Reset/Select button to select "Crank angle". Notice that the indicator lamp is illuminated. Now inch the press. Watch the readout. If the angle of the crankshaft decreases (goes from 359° towards 0°, etc.) instead of increasing (goes from 0° towards 1°, etc.), you have to switch two wires on resolver connector TB103. Switch the wires in terminals 2 and 5 (black and yellow). The angle will now increase as the ram moves.

Check the emergency stop circuit: Set your Stop Time Limit to a small value, such as 10 (milliseconds). Refer to the steps in Chapter 3 "Operation" in order to make this setting. Start the press, and then generate a stop command. The LED display should start flashing the stop time. Try to restart the press. If the press starts, there is a problem in your emergency stop circuit. Recheck all wiring and trace the cause of the problem. Repeat this test in all modes of operation including Inch, Single-stroke and Continuous, if available. Do not continue with this procedure until you confirm that the press is inhibited from restarting.

Test complete: If you got to this step, everything is working correctly. You can proceed to the next chapter on how to use your new Wintriss Brake Monitor. *You may want to increase the Stop Time Limit before proceeding to Stop Time tests.*

Chapter 3
Operation

Operation of Wintriss Brake Monitor is very simple. This chapter shows you how to:

- view key press information
- perform a 90° stop-time test and view the results
- set stop time limit

How to view information on the display

You can look at up to six items on the screen. These items include:

- SPM (press speed)
- crank angle
- 90° stop test
- stopping time
- stopping angle
- stop time limit

When you first turn power ON to Wintriss Brake Monitor, the current crankshaft angle reading appears in the LED display, and "crank angle" is highlighted on the display indicator. Also the crank-angle clock dynamically displays that number of degrees. Each LED in the circularly-shaped clock represents approximately 11 degrees. (see Figure 3-1)

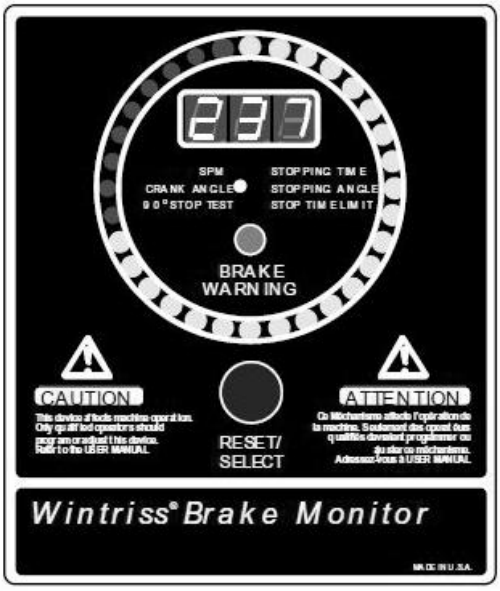


Figure 3-1. Illustrating crankshaft angle and crank-angle clock

As soon as the press is running, the current press speed appears in the LED display, and the display indicator is situated at "SPM".

Say you want to look at a different item — "stopping time". From "SPM", press the Reset/Select button two times. Notice when you press the Reset/Select button, the display indicator first scrolls down to "90° stop test". When you press the button a second time, the "stopping time" is highlighted and the last recorded reading appears. (Wintriss Brake Monitor measures a new stopping time value *every* time that the press stops.) The crank-angle clock will not be illuminated.

See Figure 3-2 for an illustration of "stopping time".

Figure 3-2. Viewing "stopping time"

Stopping time and Stop Time Limit

Wintriss Brake Monitor constantly checks the condition of the brake by measuring stopping time every time the press stops. *Stopping time* is the time that it takes the crankshaft to stop once the dual safety valve (DSV) has been closed. The monitor measures how long it takes from the time that the dual safety valve is de-energized to the actual stopping of the press crankshaft. Wintriss Brake Monitor then displays this value in milliseconds. When Wintriss Brake Monitor is first initialized, the stop time limit is factory set at 500 milliseconds. (One millisecond equals 1/1000th of a second -- 1 mS =.001 second)

Be sure that you have completed the entire installation and that everything is operating properly. If so, you are ready to:

- determine what your press's stopping time is
- calculate the press's stop time limit, and
- set the stop time limit.

Determining the press's stopping time

First you need to determine the press's stopping time under normal stopping conditions, which is usually top stop. Therefore, the stop time limit *must* be calculated based upon stopping time at top stop. To find press stopping time, follow these steps:

1. Turn power ON to Wintriss Brake Monitor, and notice that the current crankshaft angle reading appears in the LED display.

2. Install the heaviest upper die set into your press. Adjust the counterbalance for ram weight (if the press has a counterbalance).

3. Start the press. Run it in continuous mode, allowing it to reach normal operating speed. Notice now that the actual press speed -- "SPM" -- automatically appears in the LED display. (If the press is equipped with only single stroke capability, go to step 5.)

4. Top stop the press.

5. Press the Reset/Select button twice until the display indicator illuminates "stopping time".

6. Look at the reading in the LED display. This is the stopping time of your press. Remember that the number in the display is in milliseconds (mS).

7. Do this test 3 more times to see if you get higher readings. Record the highest reading from all your tests. This is the stopping time you will use to set the stop time limit.

Calculating the press's stop time limit

Once you know the press's actual stopping time, you need to add extra time to this number to compensate for *normal* wear in your brake. Otherwise, the brake monitor would stop the press as soon as the stopping time increased just slightly. This extra time is referred to as "T_{bm}". The minimum value that you can set is 10 mS. The stopping time plus T_{bm} will be the stop time limit setting.

10% for old brakes, 20% for new brakes

The rule of thumb for determining the best stop time limit is to add 20% to the stopping time of your press if your brakes are new. Add 10% if your brakes are old.

Here is the reasoning behind this rule. Stopping time should be less with a new brake. So when the 20% is added to stopping time, the number should be approximately the same as the number you get when you add 10% to stopping time for an older brake.

Examples for calculating the stop time limit

Example 1: Your recorded stopping time is 207 mS and your brake is old:

Take 10% of 207: T_{bm} = .10 x 207 = 20.7 -- *round it up to 21* --

Add 21 to 207 207 + 21 = 228

228 mS is the calculated stop time limit.

Example 2: Your recorded stopping time is 175 mS and your brake is new:

Take 20% of 175: T_{bm} = .20 x 175 = 35

Add 35 to 175 175 + 35 = 210

210 mS is the calculated stop time limit.

Setting the stop time limit

By now, you should have determined the actual stopping time of the press, and have calculated the stop time limit.

You set the stop time limit of the press based upon the press's actual stopping time. You will enter the number in milliseconds (mS), and this value should be greater than the measured stopping time, to compensate for *normal* brake wear.

1. Select "stop time limit" using the Reset/Select button. Notice that the factory setting of 500 mS appears on the LED display.
2. Open the unit and locate the UP button (S101) and DOWN button (S102). See Figure 2-4 in Chapter 2 for the exact location of these buttons inside the enclosure.
3. To increase the number from 500, press the UP button. Notice that if you hold the UP button down, the value increases by 10 mS at a time. To decrease the number, press the DOWN button. Again, holding it down makes it decrement by 10 mS.
4. Press the Reset/Select button to retain the setting. Once you are done, you can close the enclosure.

CAUTION

Any time you change the stop time limit on Wintriss Brake Monitor, you *must* perform the 90° stop-time test, and you also must recalculate the new safety distance! Go to the next section, which explains the 90° stop-time test.

Performing the 90° stop-time test

The 90° stop-time test is required in order to set the proper safety distance for personnel guarding devices including light curtains, two-hand controls, and type-B movable barriers. This test is done at the press's most critical stopping point -- 90°. The worst case scenario occurs half-way on the down stroke at 90° while the press is running in continuous mode. Therefore, Wintriss Brake Monitor is designed to check stopping time at that critical crankshaft angle, and provides you the T_S value referenced in ANSI B11.1-2009 (see Appendix B). *You must add the T_C value when you calculate safety distance. A typical value for T_C is .02 seconds (20 milliseconds).*

Follow these steps to perform the 90° stop-time test:

1. Install the heaviest upper die set into your press. Adjust the counterbalance for ram weight, if your press has a counterbalance.
2. At Wintriss Brake Monitor, select "90° Stop Test" using the Reset/Select button (See Figure 3-3. Also refer to "How to view information on the display" if you need assistance in selecting items). Now open up the unit and locate S101 "UP" button on the main board. Press the "UP" button. This arms the 90° stop-time test.

   Note: A default value of "0" appears because the test has not yet been performed.

TEST HAS BEEN ARMED!

The "90° Stop Test" display indicator will flash to alert you that the test has been armed. (To cancel the test, press the Reset/Select button once *before* starting the press.)

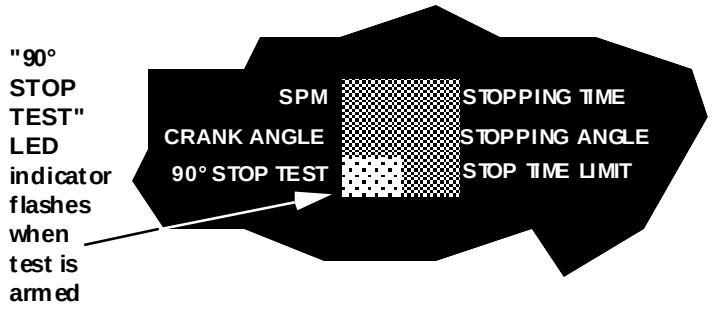


Figure 3-3. Display indicator highlighting "90° Stop Test"

3. Once you have armed the 90° stop-time test, run the press. The press will stop the very next time that it reaches 90°.

   This test should be performed while the press is actually running in continuous mode. While the press is running, select "90° test" using the Reset/Select button. Open the door and press the UP button. The press will automatically be initiated to stop at 90°.

4. Record the information displayed on the LED display (make sure that "90° Stop Test" is still highlighted on the display indicator). The stop time value is displayed in milliseconds. One millisecond equals 1/1000th of a second (1mS =.001 sec).

5. Repeat the test at least five more times to see if you get higher readings. Record the highest reading from all your tests. This is the stop time value that you will use when you calculate the safety distance.

CAUTION

Any time you change the stop time limit on Wintriss Brake Monitor, you *must* perform the 90° stop-time test, and you also must recalculate the new safety distance!

Stopping Angle

Stopping angle is the crankshaft rotation angle that it takes for the press to stop. It is the stopping position in degrees minus the crankshaft position when the dual safety valve (DSV) is closed. Stopping angle can help you when you set up your die protection system.

To view "stopping angle", press the Reset/Select button until the display indicator highlights that item. In Figure 3-4, it took 75 degrees for the press to stop, once the stop command was initiated. Stopping angle will compensate for the complete rotation when it takes *more* than 360° to stop. Notice that the illuminated LEDs in the crank-angle clock dynamically represent that number.

Viewing stopping angle on Wintriss Brake Monitor

You may notice some disparity between the "stopping angle" as shown by the brake monitor, and the number of degrees between where the stop signal was issued and where the press finally stopped. Here is an example of how it works:

Say that the speed of your press is 75 SPM. You perform a 90° stop-time test on the press. When the test is completed, you press RESET/SELECT to display the stopping angle. The stopping angle reads 50°.

You then press RESET/SELECT to display the present crankshaft angle and it reads 155°. If the stop signal was issued at 90°, and it took 50 degrees for the press to stop, you may expect the crank angle to read 90° + 50° or 140°, not 155°.

To understand the reason for the difference, you have to know a little bit about how the brake monitor works. The brake monitor needs two input signals in order to do its job. It needs a signal from the dual safety valve (DSV) so that it can determine when the press is supposed to be running, and a signal from the resolver to tell when the crankshaft of the press is turning. It measures the stopping time and stopping angle based on the difference between these two signals. When the brake monitor sees a stop signal to the DSV, it begins to monitor the resolver to see when the crankshaft actually stops turning. The stopping time is the number of milliseconds that has elapsed from when the DSV gets a stop signal and when the resolver stops turning. The stopping angle is the number of degrees that the resolver turns during the same time. The difference that you see in the stopping angles is a result of what has to happen in order for the DSV to get its stop signal.

In the case of the 90° stop time test, the following is the sequence of events that have to happen before the DSV gets the stop signal.

Event		Elapsed time
1.	The brake monitor's microprocessor sees that the resolver is at 90° and signals the stop relays to open.	3 milliseconds
2.	The stop relays open in the brake monitor.	10 milliseconds
3.	The press control responds to the stop signal and opens the relays that energize the DSV.	20 milliseconds
	TOTAL	**33 milliseconds**

In this example, it took 33 milliseconds for the DSV to get a stop signal. At 75 SPM, the press will rotate 15 degrees in 33 milliseconds. The 32-segment "crank-angle clock" display on Wintriss Brake Monitor also approximately shows the angle from where DSV deactivates to where the press stops.

You will also see a similar difference between your top stop cam angle and the stopping angle.

You may wonder how this affects the measurement of stopping time itself. As explained earlier in the section "90° Stop-time test", this brake monitor measures the value T_S, as explained in the ANSI B11.1-2009 — "the stop time of the press measured from the final de-energized control element, usually the air valve". To calculate the safety distance, you must add the value T_C, as explained in the ANSI B11.1-2009 — "the response time of the press control", typically 20 milliseconds.

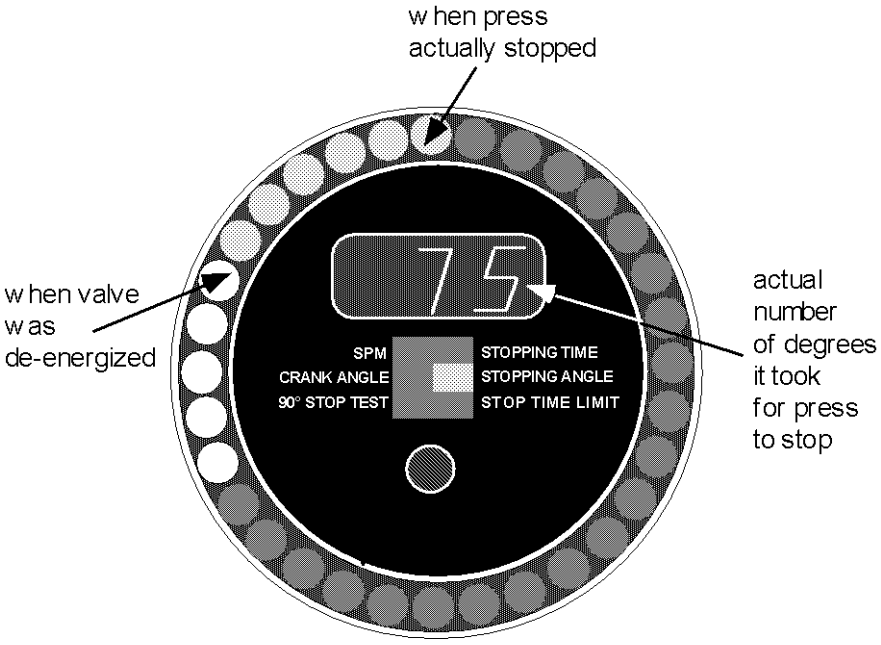


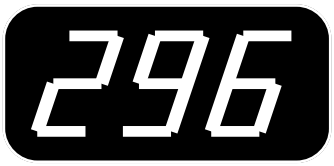
Figure 3-4. "Stopping Angle" displayed

Chapter 4 Wintriss Brake Monitor Alarms & Troubleshooting

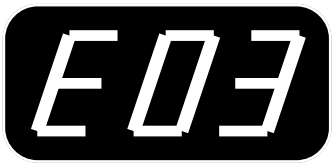
This chapter explains the error codes that you may see on your LED display when the press stops or when problems occur.

What happens when you get an error code

When a stop time limit has been exceeded, the display flashes the offending stop time value. In this example, we are illustrating a stop time value of 296 milliseconds. *Notice that the letter "E" does not precede the stop time amount.* Remember that *your* stop time value will vary!



If you get an error code, the letter *"E"* will appear along with a two-digit value, which corresponds to a particular error condition. An example is illustrated below. (To see where the "LED" display is located on the Wintriss Brake Monitor, refer to Chapter 1.)



How to clear the error code from the display

In most cases, when you want to resume operation after a fault condition occurs, you can clear the error code by pressing the Reset/Select button (or the remote reset switch, if installed). *Correct the malfunction or other problem before running the press.*

In some cases, however, you will have to clear the code by turning the unit off, then on. How to reset the system is explained in the section, "Description of error codes and how to correct".

Brake warning

Problem: When the stop time limit is within 10 milliseconds of the stop time limit, the amber-colored brake warning LED will illuminate (see Chapter 1 for the exact location of this lamp). This means that the stopping time of the press is getting extremely close to the safety limit that you had set on Wintriss Brake Monitor.

How to clear: To turn off the brake warning LED, you must turn the unit off, then on.

Remedy: The first thing that could be wrong is that your brake may be defective and/or wearing, and needs *immediate* attention from your maintenance personnel. Or if that is not the problem, it could also mean that your limit is not great enough to account for *normal* wear.

CAUTION

Any time you change the stop time limit on Wintriss Brake Monitor, you *must* perform the 90° stop-time test, and you also must recalculate the new safety distance! Refer to Chapter 3 which explains the 90° stop-time test.

You should have your maintenance crew immediately investigate the condition of the brake to ensure that it is not wearing and/or defective before you adjust the stop time limit.

Stop time exceeded

Problem: The offending stopping time number will flash in the LED display to alert you to this condition. *There will not be an "E" preceding this number.* The actual stopping time of the press has exceeded depending upon whatever limit had been set in Wintriss Brake Monitor. The stopping time is completely out of limit, and therefore the press can not be used until the brake is completely repaired.

How to clear : These flashing digits (representing the actual stopping time) can be cleared by pressing the Reset/Select button.

Remedy: *(It is assumed that you were pre-warned by the brake warning fault LED, which illuminates when the stopping time is within 10 milliseconds of the stop time limit.)* Your maintenance personnel must repair the brake immediately. If you try to continue the operation, the same error will persist every time the press stops. Once you have repaired your brake back to good working order, check your press's stopping time. Perform this test several times to get an accurate reading for your press's stopping time. Compare these results to the last time that you performed the test. Decide if the stop time limit that you had set is realistic or needs to be changed slightly. See Chapter 3 to determine and set the correct stop time limit.

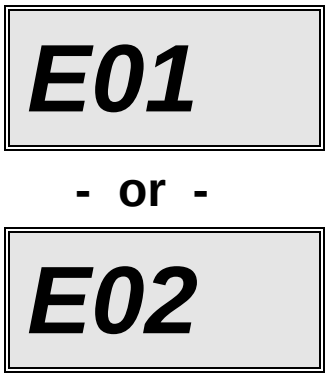
Description of error codes and how to correct

These error codes tell you that something is wrong with the Wintriss Brake Monitor resolver, input circuit, or with the way your press is running. These codes may also indicate an internal problem with Wintriss Brake Monitor itself.

If you cannot correct the problem yourself after reading the remedy for the problem below, contact Wintriss Tech. Support. Whenever you need help, just remember that we have expert technical service representatives available to help you by phone. Never hesitate to call Wintriss if you have trouble with Wintriss Brake Monitor.

Once you have corrected the problem, press the Reset/Select button (unless otherwise specified). If the problem is corrected, you will be able to run the press again. If not, you will get the same fault message.

Resolver failures



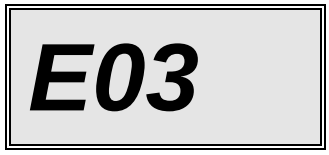
Problem: In either of these cases, there is a problem with the resolver assembly.

How to clear : This error message can be cleared by pressing the Reset/Select button.

Remedy: You will need to check the resolver and wiring. Specifically check that the terminals are tightened on bare wire and not on insulation. See Chapter 2 - "Mounting the resolver".

If necessary, contact Wintriss Tech. Support for assistance or replacement.

Loss of rotation check



Problem: The resolver did not start rotating within the start time limit that was set by Wintriss Brake Monitor. Also, the resolver could have stopped turning briefly with the press running. Wintriss Brake Monitor knows when the brake/clutch valve is activated through the input check circuit. If it sees that the valve has been activated but the resolver is not turning, *"E03"* appears. For an explanation of how the input check circuit works, refer to Chapter 2.

How to clear : This error message can be cleared by pressing the Reset/Select button.

Remedy: The start time may not have been set properly. See the Initialization section in Chapter 2 on resetting the start time limit.

The drive belt on the resolver may be loose or broken so the resolver does not turn or stops turning even though the press crankshaft is turning. Also you may have low air pressure to the clutch or a bad clutch; so the crankshaft (and therefore the resolver) did not move even though the clutch control valve has been activated.

An internal Wintriss Brake Monitor problem could also have occurred, or the resolver could be defective.

Re-initialize the start time limit (see "Initializing the Start Time Limit only" in Chapter 2). Check the resolver and resolver drive. Check and repair the clutch. If these solutions do not work, an internal problem may have occurred. Call Wintriss Tech. Support.

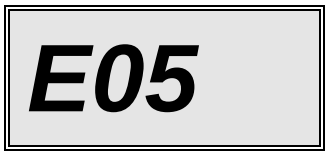
E-stop relay failure

Problem: The driver circuitry which controls the emergency stop (E-Stop) relays has a failure.

How to clear : This error message can be cleared by pressing the Reset/Select button. If this error occurs again, then Wintriss Brake Monitor needs to be serviced or replaced.

Remedy: Contact Wintriss Tech. Support for immediate assistance or replacement.

Onboard ram test failure

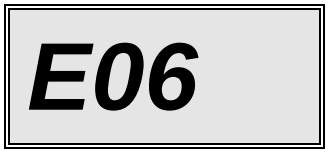


Problem: This means that something is wrong with the main Wintriss Brake Monitor circuit board.

How to clear : This error message can be cleared by pressing the Reset/Select button. If this error occurs again, then Wintriss Brake Monitor needs to be serviced or replaced.

Remedy: Contact Wintriss Tech. Support for assistance or replacement.

Input check circuit failure

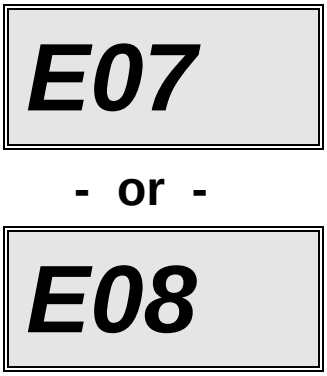


Problem: The resolver turned five times (in other words, the press was running), but Wintriss Brake Monitor received no signal from the input check circuit.

How to clear : This error message can be cleared by pressing the Reset/Select button.

Remedy: The input check circuit has not been connected or wired properly. If this message occurs when the press stops, your press is taking more than five revolutions to stop after the brake is activated. You should check your brake for wear. Check that the input check circuit voltage selector is set to the proper voltage range. For setting and wiring the input check circuit, see "Connecting AC wiring, stop circuits and input check circuit" in Chapter 2.

Program memory failure



Problem: There has been a serious internal program memory failure, and Wintriss Brake Monitor cannot operate properly.

How to clear : This error message can be cleared by pressing the Reset/Select button. If this error occurs again, then Wintriss Brake Monitor needs to be serviced or replaced.

Remedy: Contact Wintriss Tech. Support for immediate assistance or replacement.

Resolver Zero

Problem: This error occurs during the resolver zeroing process. It means that the resolver had been set outside the range of 330° to 30°.

How to clear : This error message can be cleared by pressing the Reset/Select button.

Remedy: The resolver needs to be re-zeroed properly at top dead center (TDC). To do so, refer to the section "Zeroing the resolver" in Chapter 2.

E10

Problem: The initialized Stop Time Limit and Zero Resolver values stored by Wintriss Brake Monitor in its EEPROM (read-only memory chip) was not read correctly at power-up.

How to clear : This error message can be cleared by pressing the Reset/Select button.

Remedy: You need to re-initialize the Stop Time Limit and Zero Resolver. Refer to the end of Chapter 2, "Initializing the System", if necessary. If this solution does not work, an internal problem may have occurred. Contact Wintriss Tech. Support for assistance.

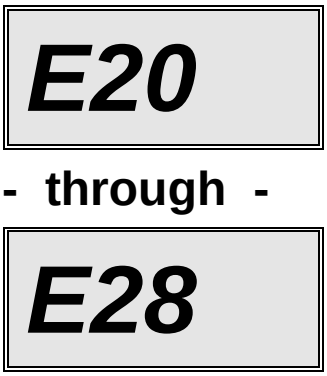
E11

Problem: The press's stopping time observed by Brake Monitor was recorded at 20 milliseconds or less. This value is erroneous and may indicate an internal failure in the unit.

How to clear : This error message can be cleared by pressing the Reset/Select button.

Remedy: If the error continues to occur, contact Wintriss Tech. Support for immediate assistance.

Emergency (E-Stop) Error codes



Problem: If any two-digit value between "E20" and "E28" appears on the display, this has to do with either of the emergency stop relay circuits not working satisfactorily. One or both of these E-STOP circuits may be defective.

How to clear : This error message cannot be cleared by pressing the Reset/Select button. Instead, turn the unit off, then on.

Remedy: If the error continues to occur, contact Wintriss Tech. Support for assistance.

Angle Resolver Failure

Problem: The press is going faster than 1000 SPM (Wintriss Brake Monitor's rated press speed), or the resolver has failed. Or it may just be that the wiring in the resolver circuit to Wintriss Brake Monitor is loose or bad.

> **NOTE**
> If you have a Wintriss Brake Monitor allowing press speeds up to 2000 SPM, the message will pertain to 2000 SPM, not 1000.

How to clear : This error message cannot be cleared by pressing the Reset/Select button. Instead, turn the unit off, then on.

Remedy: If Wintriss Brake Monitor's rated press speed is exceeded, reduce the speed. If not, check the resolver wiring and connections for shorts, breaks, or loose connections. See Chapter 2 "Mounting the resolver" for complete information about resolver wiring. If the wiring is not the problem, the resolver is probably bad and will have to be replaced.

Appendix A
Extracts from OSHA Regulations

> **⚠ WARNING**
>
> **REFER TO CURRENT REVISIONS OF OSHA/ANSI DOCUMENTS**
>
> The following extracts from OSHA and ANSI documents are provided for the user's convenience only. Refer to the most recent revisions of the original OSHA safety regulations and ANSI standards to ensure that you have the most up-to-date information.
>
> **Failure to comply with these instructions could result in death or serious injury.**

This appendix provides extracts from the Occupational Safety and Health Administration (OSHA) regulations and the American National Standards Institute (ANSI) standards covering presence-sensing devices.

Extracts from OSHA Regulation 1910.217

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

Reprinted below are extracts from OSHA regulation 1910.217 pertaining to the use of presence-sensing devices for point-of-operation guarding on mechanical power presses. Also reprinted here are interpretations of selected regulations provided by the Precision Metalforming Association (PMA). Extracts from the OSHA regulation are printed in the left-hand column; interpretations by PMA are shown in the right-hand column.

Wintriss makes no claim for the accuracy or effectiveness of the PMA interpretations, and persons making use of this material do so at their own risk. PMA interpretations should not be relied upon for use in any specific application. The material is provided, with PMA's permission, for informational purposes only.

Refer to the most recent versions of OSHA documents. To obtain copies of OSHA regulations, write to: OSHA's Office of Information and Consumer Affairs, 200 Constitution Avenue NW, Room N3647, Washington, DC 20210. Tel (202) 219-8151; fax (202) 219-5986.

Extracts from OSHA Regulation 1910.217

OSHA Regulations	PMA Interpretation
OSHA 1910.217 (c). (c) Safeguarding the point of operation. (1) General requirements. (i) It shall be the responsibility of the employer to provide and insure the usage of "point of operation guards" or properly applied and adjusted point of operation devices on every operation performed on a mechanical power press. See Table 0-10.	*TABLE 0-10* *Distance of opening from point of operation hazard (inches) — Maximum width of opening (inches)* *1/2 to 1 1/2 ..... 1/4* *1 1/2 to 2 1/2 ..... 3/8* *2 1/2 to 3 1/2 ..... 1/2* *3 1/2 to 5 1/2 ..... 5/8* *5 1/2 to 6 1/2 ..... 3/4* *6 1/2 to 7 1/2 ..... 7/8* *7 1/2 to 12 1/2 ..... 1 1/4* *12 1/2 to 15 1/2 ..... 1 1/2* *15 1/2 to 17 1/2 ..... 1 7/8* *17 1/2 to 31 1/2 ..... 2 1/8*
OSHA 1910.217 (c) (3) (i) (a) (3) Point of operation devices. (i) Point of operation devices shall protect the operator by: (a) Preventing and/or stopping normal stroking of the press if the operator's hands are inadvertently placed in the point of operation.	*Presence-sensing device* *(c) (3) (i) (a) Refers to the functional requirement of a presence-sensing device which prevents and/or stops normal stroking of the press.*
OSHA 1910.217 (c) (3) (iii) (iii) A presence-sensing point of operation device shall protect the operator as provided in paragraph (c) (3) (i) (a) of this section, and shall be interlocked into the control circuit to prevent or stop slide motion if the operator's hand or other part of his body is within the sensing field of the device during the downstroke of the press slide. (a) The device may not be used on machines using full revolution clutches. (b) The device may not be used as a tripping means to initiate slide motion. (c) The device shall be constructed so that a failure within the system does not prevent the normal stopping action from being applied to the press when required, but does prevent the initiation of a successive stroke until the failure is corrected. The failure shall be indicated by the system.	*European method (curtain of light) uses self trip safety system effectively. Variance applied for 11/17/73 by Interlake Stamping Company to use this fail safe system.* *When failure occurs, the best indication is the press won't run.*

Extracts from OSHA Regulation 1910.217

OSHA Regulations	PMA Interpretation
(d) Muting (bypassing of the protective function) of such device, during the upstroke of the press slide, is permitted for the purpose of parts ejection, circuit checking and feeding.	*Top of stroke is the point at which muting shall cease as it is not possible to set a point on the downstroke as the exact position where the hazard of die closing starts.*
(e) The safety distance (D_S) from the sensing field to the point of operation shall be greater than the distance determined by the following formula:	*Safety distance represents the distance an operator can move his hand during the time it takes a press to stop. The internationally recognized hand reach speed is 63 inches/second.*
D_S = 63 inches/second x T_S where	
D_S = minimum safety distance (inches);	*To determine this safety distance, the stopping time of the press is measured with some appropriate measuring device. The measurement is taken such that the stop signal is given to the press at the 90 degree point of the crank position.*
63 inches/second = hand speed constant and	
T_S = stopping time of the press measured at approximately 90° position of crankshaft rotation (seconds)	*Since some stopping time increase must be accommodated due to braking system deterioration, a percentage factor must be added to the measured time to obtain the factor for use in the equation for determining safety distance. A percentage factor of 20% is recommended for presses with new brakes or brakes of good condition. For older brakes, a 10% factor is recommended.*
	Example: *Measured stopping time = 0.190 seconds* *Time factor = 1.2 x 0.19 = 0.228 seconds* *Calculation = 63 x 0.228* *Safety distance = 14.4 inches*
(f) Guards shall be used to protect all areas of entry to the point of operation not protected by the presence-sensing device.	*(3) (iii) (f) Great care must be taken to assure that no access to the die area exists unguarded.*
OSHA 1910.217 (c) (3) (5)	
(5) Additional requirements for safe-guarding. Where the operator feeds or removes parts by placing one or both hands in the point of operation, and a two hand control, presence-sensing device, Type B gate or movable barrier (on a part revolving clutch) is used for safeguarding:	*This paragraph tells the condition under which a brake monitoring system is required after November 1, 1975.*

Extracts from OSHA Regulation 1910.217

OSHA Regulations	PMA Interpretation
OSHA 1910.217 (c) (3) (5) (cont) (i) The employer shall use a control system and brake monitor which comply with paragraphs (b) (13) and (14) of this section. This requirement should be complied with by November 1, 1975.	(b) (13) Control reliability (b) (14) Construction requirements.
OSHA 1910.217 (c) (3) (vii) (c) (c) The safety distance (D_S) between each two hand control device and the point of operation shall be greater than the distance determined by the following formula: Ds = 63 inches/second x T_S, where: Ds = minimum safety distance (inches); 63 inches/second = hand speed constant; and T_S = stopping time of the press measured at approximately 90° position of crankshaft rotation (seconds).	*Example:* *Measured stopping Time = 0.190 seconds* *Time Factor = 1.2 x 0.19 = 0.228 seconds* *Calculation = 63 x 0.228* *Safety Distance = 14.4 inches*
OSHA 1910.217 (e) (1) (e) INSPECTION, MAINTENANCE, AND MODIFICATION OF PRESSES (i) It shall be the responsibility of the employer to establish and follow a program of periodic and regular inspections of his power presses to insure that all their parts, auxiliary equipment, and safeguards are in safe operating condition and adjustment. The employer shall maintain records of these inspections and the maintenance work performed.	*Records of clutch and brake will be weekly. Other inspections are periodic subject to time factor determined by employer.*
(ii) Each press shall be inspected and tested no less than weekly to determine the condition of the clutch/brake mechanism, anti-repeat feature and single stroke mechanism. Necessary maintenance or repair or both shall be performed and completed before the press is operated. The employer shall maintain records of these inspections and the maintenance work performed. These requirements do not apply to those presses which comply with paragraphs (b) (13) and (14) of this section.	*If brake monitoring system is installed, weekly inspection and records are not required for clutch/brake mechanism. Other parts of the press will require periodic inspections and records.*

Appendix B
Extracts from ANSI Standards

> **⚠ WARNING**
>
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>
> The following extracts from OSHA and ANSI documents are provided for the user's convenience only. Refer to the most recent revisions of the original OSHA safety regulations and ANSI standards to ensure that you have the most up-to-date information.
>
> **Failure to comply with these instructions could result in death or serious injury.**

Reprinted below are the American National Standards Institute (ANSI) standards for presence-sensing devices (light curtains) and Two-hand controls. ANSI, a national federation of trade associations, technical societies, professional groups, and consumer organizations, is the United States clearinghouse and coordinating body for voluntary standards activity. Approximately 1000 companies are affiliated with the Institute as company members.

ANSI creates voluntary standards to eliminate duplication and to weld conflicting standards into single, nationally accepted standards under the designation "American National Standards." The standards reflect a national consensus of manufacturers; consumers; scientific, technical, and professional organizations; and governmental agencies.

Shown below are extracts of standards requirements and explanatory information from ANSI B11.1-2009 and ANSI B11.19-2003 for presence-sensing devices (light curtains) and Two-hand controls. Complete versions of these documents can be obtained by writing to: ANSI, 1430 Broadway, New York, NY 10018.

Extracts from ANSI B11.1-2009 8.6.2.1

Standards Requirements	Explanatory Information
8.6.2.1.7 Each operator's hand controls shall be located at a distance from the point-of-operation so that the operator(s) cannot release either hand actuating control and reach into the point-of-operation during the hazardous portion of the cycle.	***E8.6.2.1.7*** The total stopping time of the press should include the total response time of the control system and the time it takes hazardous motion to stop. The following formula should be used when calculating the safety distance (D_S): $D_S = K (T_S + T_C + T_{bm})$ Where: K = 63 inches/second (hand speed constant). T_S = the stop time of the press measured from the final de-energized control element, usually the air valve. T_C = the response time of the control. T_{bm} = the additional time allowed by the stopping-performance monitor (brake monitor) before it detects stop time deterioration. NOTE - $T_S + T_C$ are usually measured by a stop time measuring device. When the press stopping-performance monitor setting is changed, the safety distance should be recalculated. See also Annex C.

Extracts from ANSI B11.1-2009 8.6.3

Standards Requirements	Explanatory Information
8.6.3 Presence-sensing safeguarding device	
8.6.3.1 A presence-sensing device, when used for safeguarding, shall protect the operator as specified in E8.6.1 (a).	***E8.6.3.1*** Various presence-sensing devices employ different sensing and adjustment techniques. The point at which a device responds to an intrusion can vary. Safety mats and area scanners may not be suitable (effective) safeguards when utilized as primary point-of-operation safeguarding. Factors which can affect this suitability include but are not limited to: a) response time; b) minimum object sensitivity; c) measurement accuracy; d) breach ability; e) penetration before detection; f) single point of failure; g) large safety distances. These devices may be utilized as supplemental safeguarding.
8.6.3.2 The device shall interface with the control circuit to prevent or stop slide motion if any object is within the sensing field of the device during the hazardous portion of the cycle.	***E8.6.3.2*** The device should be located or adjusted so that the device always responds to the intrusion at or prior to the safety distance D_S. Also, care should be taken when installing the device so that it does not detect false signals from other devices or equipment in the area. The presence-sensing device cannot protect against a catastrophic failure of the press, which causes unintended cycling action. See Annex A, Figure A.3.
8.6.3.3 The device shall not be used for safeguarding the point-of-operation on presses using full-revolution clutches.	
8.6.3.4 When the sensing field has been interrupted, use of the normal press cycle-actuating means shall be required after clearing the sensing field to resume press operation.	
8.6.3.5 When the device is used in the PSDI mode, re-initiation of the press motion shall be in accordance with 6.4.3.8.1.	

Extracts from ANSI B11.1-2009 8.6.3

Standards Requirements	Explanatory Information
8.6.3.6 Muting of the device shall be permitted only during the non-hazardous portion of the press cycle.	***E8.6.3.6*** Muting is typically accomplished by interface circuits or auxiliary controls. The die closing portion of the cycle is always considered hazardous. In some cases, feeding and transfer automation or die features can cause additional hazardous conditions even during the opening portion of the cycle (up-stroke). See also ANSI B11.19 for additional information.
8.6.3.7 Muting of the device shall be accomplished in a manner that conforms to the requirements of 6.11 and 8.8.	***E8.6.3.7*** Muting is typically accomplished by interface circuits or auxiliary controls. The muting element should incorporate a similar level of control reliability as the presence-sensing device itself. A simple cam-operated limit switch wired in parallel with the device's output is inadequate as its failure can remain undetected.
8.6.3.8 The device shall have an identifiable minimum object sensitivity so that an obstruction of an equal or greater size will be detected anywhere within the sensing field regardless of the plane of intrusion.	***E8.6.3.8*** The device should have a minimum object sensitivity stated by the device supplier. For example, an electro-optical device may detect a 32 mm (1-1/4 inch) diameter opaque object anywhere in its sensing field but allow 25 mm (1 inch) obstructions to pass undetected at certain points in the field.
8.6.3.9 The device shall have a maximum response time, which shall not be affected by object sensitivity adjustments or environmental changes.	***E8.6.3.9*** The device supplier should state the maximum total response time, including output devices, of the presence-sensing device.
8.6.3.10 Devices which require adjustments to accommodate variations in operating conditions, or which incorporate fixed blanking or floating blanking features, shall be designed so that the adjustments or features are capable of supervisory control by the user.	***E8.6.3.10*** Typically, these adjustments or controls are key-operated or located under lockable covers.

Extracts from ANSI B11.1-2009 8.6.3

Standards Requirements	Explanatory Information
8.6.3.11 The device shall be provided with a means that visibly indicates when it is functioning properly.	***E8.6.3.11*** Red and green indicators or other means that can be easily seen by the operator and others should be provided to indicate that the device is functioning.
Indication that the sensing field is being blanked shall be provided. For fixed blanking, the blanked area shall be identified. Supplemental safeguarding shall be provided to prevent access to the hazard through the fixed blanked area.	The blanking function of a presence-sensing safeguarding device desensitizes a portion of the sensing field by disabling one or more channels such that a specific interruption is ignored. Presence-sensing devices can be provided with either fixed or floating blanking. For fixed blanking, the desensitized area does not move or change once configured. Floating blanking allows the blanked area to move within the sensing field. Means to identify the desensitized area may include but are not limited to: a) Indicators within the device; b) Signage or marking of the fixed blanked area; c) The physical location of the object in the blanked area if movement or removal of the object can be detected and it results in a stop command. Means of supplemental safeguarding can include completely filling the fixed blanked area to restrict access to the hazard, installing the device at a distance that accounts for the worse case object sensitivity (see 8.6.3.16), or alternate safe-guarding may be provided to prevent access to the hazard.
If means are provided to bypass the device, visible indication that the device is bypassed shall be provided.	Means to provide visible indication may include but are not limited to: a) colored indicator lights; b) signage; c) physical position; d) awareness barrier (i.e., safety tape); e) other means.
8.6.3.12 The device shall not fail to respond to the presence of the individual's hand or other body part due to the presence of a reflective object or workpiece.	

Extracts from ANSI B11.1-2009 8.6.3

Standards Requirements	Explanatory Information
8.6.3.13 The device shall conform to the requirements of 6.11 and 8.8. In the event of a power failure to the device, the device shall initiate a stop command to the press control system.	
8.6.3.14 The interface of the presence-sensing device to the press control shall conform to the requirements of 6.11 and 8.8.	
8.6.3.15 The sensitivity of the device to intrusion shall not be adversely affected by changing conditions around the press.	
8.6.3.16 The effective sensing field of the device shall be located at distance from the nearest point-of-operation hazard so that individuals cannot reach into the point of operation with a hand or other body part before cessation of motion during the hazardous portion of the cycle.	***E8.6.3.16*** The total stopping time of the press should include the total response time of the presence-sensing device, as stated by the supplier, the response time of the interface, the response time of the control system, and the time it takes the press to cease slide motion. The following formula should be used when calculating the safety distance: $Ds = K\ (T_S + T_C + T_r + T_{bm}) + D_{pf}$ where K = 63 inches/second (hand speed constant) T_S = the stop time of the press measured from the final de-energized control element, usually the air valve. T_C = the response time of the press control. T_r = the response time of the presence-sensing device and its interface, if any, as stated by the supplier or measured by the user. T_{bm} = the additional stopping time allowed by the stopping-performance monitor before it detects stop time deterioration. D_{pf} = the added distance due to the penetration factor as recommended in ANSI B11.19, Annex D, Figure D.2. The minimum object sensitivity is stated by the supplier. If beam blankouts or floating window features are used, these figures should be added to the object sensitivity figure before using the chart.

Extracts from ANSI B11.1-2009 8.6.3

Standards Requirements	Explanatory Information
8.6.3.16 (cont)	NOTE - T_S + T_C is usually measured by a stop time measuring device. See also ANSI B11.19, Annex C and D. Whenever the press-cycle STOP command or stopping-performance monitor time or angle setting is changed, the safety distance should be recalculated. See also “stopping-performance monitor” (6.12). NOTE – No increase in safety distance is required for fixed blanking applications if the blanked area is entirely occupied by the material or fixtures. In some instances, the use of blanking does not allow efficient production of certain piece parts. Horizontal placement of the sensing field, so that it detects the operator’s waist area, may present a solution. In this application, the operator may freely manipulate the workpiece and operate the press as long as the operator stands outside of the horizontal sensing field. The sensing field should be located so that the operator cannot reach the point-of-operation prior to interrupting the sensing field and completion of the stopping action. Where possible, the sensing field should be of sufficient depth to prevent the operator from standing between the field and the point-of-operation. See also ANSI B11.19, Annex C and D.
8.6.3.17 If the position of the device will allow the operator or others to place themselves between the sensing field and the point-of-operation, additional means shall be provided in conjunction with the device to prevent the operator or others from exposure to the point-of-operation hazard.	***E8.6.3.17*** Additional means may include manual reset outside of the sensing field of the device or additional barrier guards, safety mats, light curtains or other devices. Operator controls for each operator located outside of the sensing field of the presence-sensing device may be used. As an alternative to the reset control and to prevent an individual from stepping behind the sensing field of a PSD, the maximum distance between the light curtain and the machine structure should not exceed 75mm (3 inches). Supplemental safeguarding may be utilized to eliminate a space greater than 75mm.

Extracts from ANSI B11.1-2009 8.6.3

Standards Requirements	Explanatory Information
8.6.3.18 The device shall not be affected by ambient light or by light-source decay so that the increase in response time or object sensitivity is greater than the value used to calculate the safety distance.	***E8.6.3.18*** Examples of ambient light are associated with windows, light fixtures, skylights, bay doors, or die lights.
8.6.3.19 All areas of entry to the point-of-operation not protected by the presence-sensing device shall be otherwise safeguarded.	***E8.6.3.19*** Usually the electro-optical presence-sensing device is used in a manner that provides a protected zone in front of the primary work area with auxiliary devices or guards used to protect secondary access areas. In some cases, mirrors may be used in conjunction with the device to provide two-, three- or four-sided protection.
8.6.3.20 Press production systems with a configuration that would allow an individual to enter, pass through, and become clear of the presence–sensing device sensing field shall not be operated in the PSDI mode of operation.	***E8.6.3.20*** For PSDI applications see Clause 10.
8.6.3.21 When a device is used on a press production system and the protection of the operator is dependent upon the stopping action of the press, a stopping-performance monitor shall be required in conformance with 6.12. See section 8.3.9 for exceptions.	

Extracts from ANSI B11.19-2003 8.3

Standards Requirements	Explanatory Information
8.3 Electro-Optical, RF, and area scanning presence-sensing safeguarding devices	
8.3.1 Design and Construction	
8.3.1.1 The presence-sensing device shall be designed and constructed to create a field that detects the presence of an individual(s). The presence-sensing device shall not create a hazard in and of itself.	***E8.3.1.1*** The device should be designed and constructed such that it does not present hazards to individuals from: sharp edge or pinch point hazards; radiated light or energy hazards; electromagnetic interference hazards; electrical shock hazards.
8.3.1.2 The electro-optical presence-sensing device shall have a minimum object sensitivity such that an obstruction of a same or greater size will always be detected anywhere within its sensing field, regardless of the plane of intrusion.	***E8.3.1.2*** The presence-sensing device should have a minimum object sensitivity stated by the supplier. For example, an electro-optical device may detect an opaque object with a diameter of 32 mm (1-1/4 inch) anywhere in its sensing field, but allow an obstruction with a diameter of 25 mm (1 inch) to pass undetected at certain points in the field.
8.3.1.3 The device shall not fail to change its output state, if not muted, when it detects the presence of an individual.	***E8.3.1.3*** Muting may be accomplished by the device, its interface, auxiliary controls, or the machine control system. When the device provides the muting, its output may or may not change state.
8.3.1.4 Adjustment or configuration of presence-sensing devices shall be capable of being supervised by the user.	***E8.3.1.4*** Methods of meeting this requirement include, but are not limited to, the use of key operated controls or controls located under lockable covers. Adjustments or configuration can include, but are not limited to: muting; blanking; power adjustments; sensing field configuration; reset functions.

Extracts from ANSI B11.19-2003 8.3

Standards Requirements	Explanatory Information
8.3.1.5 The presence-sensing device shall incorporate visual means to indicate that the device is detecting an individual within the effective sensing field of the device.	***E8.3.1.5*** Indicators (usually red and green), displays or meters should be provided to indicate the status of the device. The visual means may be integral to the device or part of the interface or machine control system. Due to the prevalence of color blindness, methods such as unambiguous positioning, patterning, labeling or flashing of the indicators may be effective in providing the indication required.
8.3.1.6 The presence-sensing device shall have a maximum response time that shall not be affected by object sensitivity or environmental changes. The safeguarding supplier shall provide the maximum response time of the presence-sensing device.	
8.3.1.7 The RF (radio frequency) presence-sensing device shall provide means to adjust the sensitivity of the field. The field, once adjusted, shall not decrease in sensitivity below this established level.	
8.3.1.8 The electro-optical device shall not be affected by ambient light conditions or by changes in the device light source characteristics, such that an increase in response time or object sensitivity occurs.	***E8.3.1.8*** When the electro-optical device is exposed to signals from other electro-optical devices or to changes in ambient light commonly associated with windows, light fixtures, skylights, bay doors or work area lights, the response time or object sensitivity should not be adversely affected.
8.3.1.9 Components, subassemblies or modules of electro-optical, RF, and area scanning presence-sensing safeguarding devices shall be designed and constructed to meet the requirements of 6.1.	

Extracts from ANSI B11.19-2003 8.3

Standards Requirements	Explanatory Information
8.3.1.10 The area scanning device shall provide a means or operating mode to verify the size, shape, and detection capabilities of the detection area or zone. Information shall be provided by the area scanning device supplier to identify the: a) maximum safeguarding range; b) minimum object sensitivity within the stated safeguarding range; c) maximum field of view in degrees; d) tolerance in the range measurement; and e) detection capabilities with respect to the reflectivity of an object versus the distance to the object.	***E8.3.1.10*** These devices typically operate on the principle of “diffuse reflectance," which is a principle of transmitting beam(s) of light to form a detection area or zone. When an object enters the detection area, it reflects the transmitted light back to the device, which then evaluates the object's position. The amount of reflected light (degree of reflectance in percent) that can be reliably detected typically ranges from 1.8% to over 90% and can be represented graphically by reflectivity versus distance. For more information, see IEC 61496, parts 1 and 3.

Extracts from ANSI B11.19-2003 8.3

Standards Requirements	Explanatory Information
8.3.2 Installation, operation, and maintenance	
8.3.2.1 Exposure to the hazard(s) shall not be possible by reaching over, under or around the sensing field of the device. Additional guards or safeguarding devices shall be provided to protect those areas.	***E8.3.2.1*** The user should select a presence-sensing device adequate to prevent individuals from reaching over, under or around the sensing field during the hazardous portion of the machine cycle. Additional safeguarding may be required in conjunction with the device to meet this requirement.
The effective sensing field shall be of adequate height, width, and depth so that entry of the individual into the hazard area is detected.	If individuals can place themselves between the sensing field and the hazard area, additional safeguarding should be used in conjunction with the device to prevent the individual from exposure to the hazard. When an individual can pass through the sensing field, see the requirements of 8.3.2.3. The electro-optical presence-sensing device may fail to detect an individual's presence due to reflective workpieces or objects in the vicinity of the device. Care should be used to ensure that these reflections do not render the device ineffective. Some examples of reflective objects include, but are not limited to: machine surfaces; tooling; work pieces; hand tools; auxiliary equipment; workholding tables and fixtures. Testing each set-up for minimum object sensitivity should be done with an appropriate test rod, following the supplier's recommendation. Where objects are placed within the defined sensing field of an area optical laser scanner, care should be taken to ensure that: a) No shadows exist behind the objects such that the device is rendered ineffective; b) Removal of the object will not allow undetected access to a hazard area.

Extracts from ANSI B11.19-2003 8.3

Standards Requirements	Explanatory Information
The device shall be installed such that it does not create additional hazards.	Some installation hazards include, but are not limited to: pinch point hazards created by interference between the device and moving members of the machine; tripping hazards; electrical shock hazards; overhead or other "strike against" hazards; thermal hazards. Where such conditions can exist, additional safeguarding may be required.
8.3.2.2 The presence-sensing device shall be installed at a location so that the effective sensing field prevents individuals from reaching the hazard(s) during the hazardous portion of the machine cycle.	***E8.3.2.2*** The safety distance calculation is dependent upon the: total response time of the device as stated by the safeguarding supplier; response time of the interface; response time of the control system; time it takes the machine to stop hazardous motion; and depth penetration factor of the device. See Annex D for the formula(e) to calculate the safety distance. Radio frequency devices have sensing fields that can vary due to: antenna(e) design; effects of adjacent machinery and equipment; field sensitivity adjustments; and environmental factors (such as humidity or temperature). Before the machine is used for production purposes, the RF device should be checked to ensure that the effective field protects individuals at the safety distance.

Extracts from ANSI B11.19-2003 8.3

Standards Requirements	Explanatory Information
8.3.2.3 The presence-sensing device shall protect individuals from hazards by initiating an immediate stop command to the machine control system when the sensing field of the device is interrupted during the hazardous portion of the machine cycle. It shall require reinitiation of the normal actuating means prior to the start or continuation of motion of the machine.	
When an individual can pass through the sensing field of the presence-sensing device, the device shall initiate an immediate stop command to the machine control system and shall require that the device or machine control be manually reset before hazardous motion can occur.	The operator should ensure that no individual is in the safeguarded area before re-setting the device or machine control and initiating hazardous motion.
The reset device shall be located outside of the safeguarded area such that it cannot be reached from within the safeguarded area. Reset of the device or machine control shall not occur until verification that the safeguarded area is clear of individuals.	Key lock reset switches located at various positions around the safeguarded area may be one method of accomplishing this requirement.
8.3.2.4 Components, subassemblies or modules of the interface or machine control system shall meet the requirements of 6.1.	
8.3.2.5 Muting of the device shall be permitted during the non-hazardous portion of the machine cycle. Muting of the device shall be accomplished such that a single failure of a component, a subassembly or a module of the system / device that affects the performance of the safety-related functions shall not prevent a normal stop command from being initiated, or shall cause an immediate stop command. In the event of a failure, re-initiation of the machine shall be prevented until the failure is corrected or the system or device is manually reset.	***E8.3.2.5*** Muting is typically accomplished by interface circuits or auxiliary controls. The muting element should incorporate a similar level of control reliability as the presence-sensing device itself. A simple cam-operated limit switch wired in parallel with the device's output is inadequate, as its failure can remain undetected.
In the presence of a failure, repetitive manual reset of the system or device shall not be used for production.	The intention of a manual reset is to encourage the diagnosis of a failed component, subassembly, device or module. A second failure may occur during the diagnostic or troubleshooting process, negating the safety function(s). Additional safeguarding should be used to protect individuals during this process. See the definition for control reliability and Annex C for further information.

Extracts from ANSI B11.19-2003 8.3

Standards Requirements	Explanatory Information
If the machine has reversing capability where a muting hazard is possible, the control system shall include an automatic means so muting is only permitted in the forward direction.	One method of meeting this requirement is by the use of a control circuit interlock on the drive motor starter (forward direction contact) to allow "muting" only in the forward direction when the starter is energized. See 8.3.2.1.
If an individual can pass through a sensing field when the device is muted, means shall be provided to ensure that the individual is outside of the hazard area, or that the machine ceases hazardous motion when the muting is removed.	
8.3.2.6 Bypassing of the device shall be capable of being supervised by the user. Indication that the device is active or bypassed shall be provided and shall be readily observable by individuals protected by the device.	***E8.3.2.6*** Care should be taken to ensure that the operators and other individuals are aware that the device has been bypassed so that individuals do not assume that the device is active and they are safeguarded when, in fact, the device is bypassed.
When bypassed, the device, interface or control system shall not indicate any state other than "bypass."	An amber indicator lamp or other means may be used to meet this requirement.
When the device is bypassed, other safeguarding must be provided and used.	When bypassed, the device's normal status indicators can be misleading if still active. One method that may be used to meet this requirement is to remove power to the device or to disable the normal status indicators when it is bypassed or not being used. Due to the prevalence of color blindness, methods such as unambiguous positioning, patterning, labeling or flashing of the indicators may be effective in providing the indication required.
8.3.2.7 The radio frequency device shall not be adversely affected by changes around the machine that may alter the sensitivity of the device such that individuals are no longer detected in the sensing field at the proper safety distance.	***E8.3.2.7*** The radio frequency device may be affected by changes in the conditions around the machine such as ambient conditions, the placement of parts and tote boxes, grounding conditions of the operator, or the movement of industrial trucks. These changes should not adversely affect the performance of the device.

Extracts from ANSI B11.19-2003 8.3

Standards Requirements	Explanatory Information
8.3.2.8 The total tolerance in the range measurement of an area scanning device shall be included in determining the distance from the nearest recognized hazard to the detection area or zone. This detection area shall be identified and tested to ensure that the device is able to detect individuals entering the detection area. The effective sensing field shall be verified for proper size and coverage upon installation, replacement, or changes of the detection area.	***E8.3.2.8*** When the device is horizontally mounted, the detection area or zone should be visibly marked on the floor. This verification can be accomplished by using a programming device or by physically identifying the perimeter of the detection area with an appropriate test rod, following the supplier's recommendation. This verification is to ensure that a preprogrammed device with a small or improper detection area is not used by mistake in an installation requiring a larger field. Area scanners may not be suitable (effective) safeguards when used to protect an individual's hands or fingers from hazards. Items which can affect this suitability are: response time; minimum object sensitivity; measurement accuracy.

Appendix C
Wintriss Brake Monitor Panel Mount

This appendix explains how to install your Wintriss Brake Monitor panel mount. Refer to Chapter 2 for the remainder of the installation steps.

Standard Enclosure versus Optional Panel Mount

Wintriss Brake Monitor is available either with an enclosure or as a panel mount. If you have the panel mount option, there is a new keylock switch available, "Stop Time Setting". Turn this switch towards "up" every time "UP BUTTON S101" (inside the enclosure) is mentioned in the manual, and towards "down" for "DOWN BUTTON S102", *with the exception of when you initialize the system (found at the end of Chapter 2) In this case, use S101.* Note that these switches S101 and S102 are still active, if you choose to use them instead of the Stop Time Setting keylock switch.

Be sure to allow *at least* 4" (10.2 cm) of clearance behind the panel mounting plane to allow enough room for the electronics.

Preparation for mounting Wintriss Brake Monitor using your enclosure

To prepare for mounting, follow these steps:

1. Determine a convenient place to mount Wintriss Brake Monitor into your panel enclosure. Ideally it should be close to the press control so operators and setup personnel can easily see the display and crank-angle clock.
2. Cut out a hole in your panel enclosure, and drill and tap twelve holes for #10-32 screws. Refer to the drawings in Figure C-1 for mounting dimensions.
3. Prop Wintriss Brake Monitor near the location where it will ultimately be mounted (see Figure C-1). You can do this by connecting ty wraps from two of the left holes on the panel to the corresponding holes on the enclosure for a hinge-like effect. Allow up to 9" of service loop when performing the wiring connections. Also make sure all cables will reach.
4. Refer to Chapter 2 of the Wintriss Brake Monitor user manual to complete the installation.

PLACE WINTRISS BRAKE MONITOR AT A CONVENIENT HEIGHT

Wintriss Brake Monitor should be installed at a convenient height for all users. Experiment to determine a good height for everybody prior to wiring and mounting.

Final assembly

Once the final checkout has been confirmed and Wintriss Brake Monitor is working satisfactorily while it has been sitting outside the enclosure, you are ready to completely install the Wintriss Brake Monitor panel mount into your enclosure.

Remember earlier you had cut out a hole in your panel enclosure. Mount the Wintriss Brake Monitor panel assembly into this cavity using twelve #10-32 screws. Refer to Figure C-1 for mounting and "cutout" dimensions for Wintriss Brake Monitor panel and your enclosure.

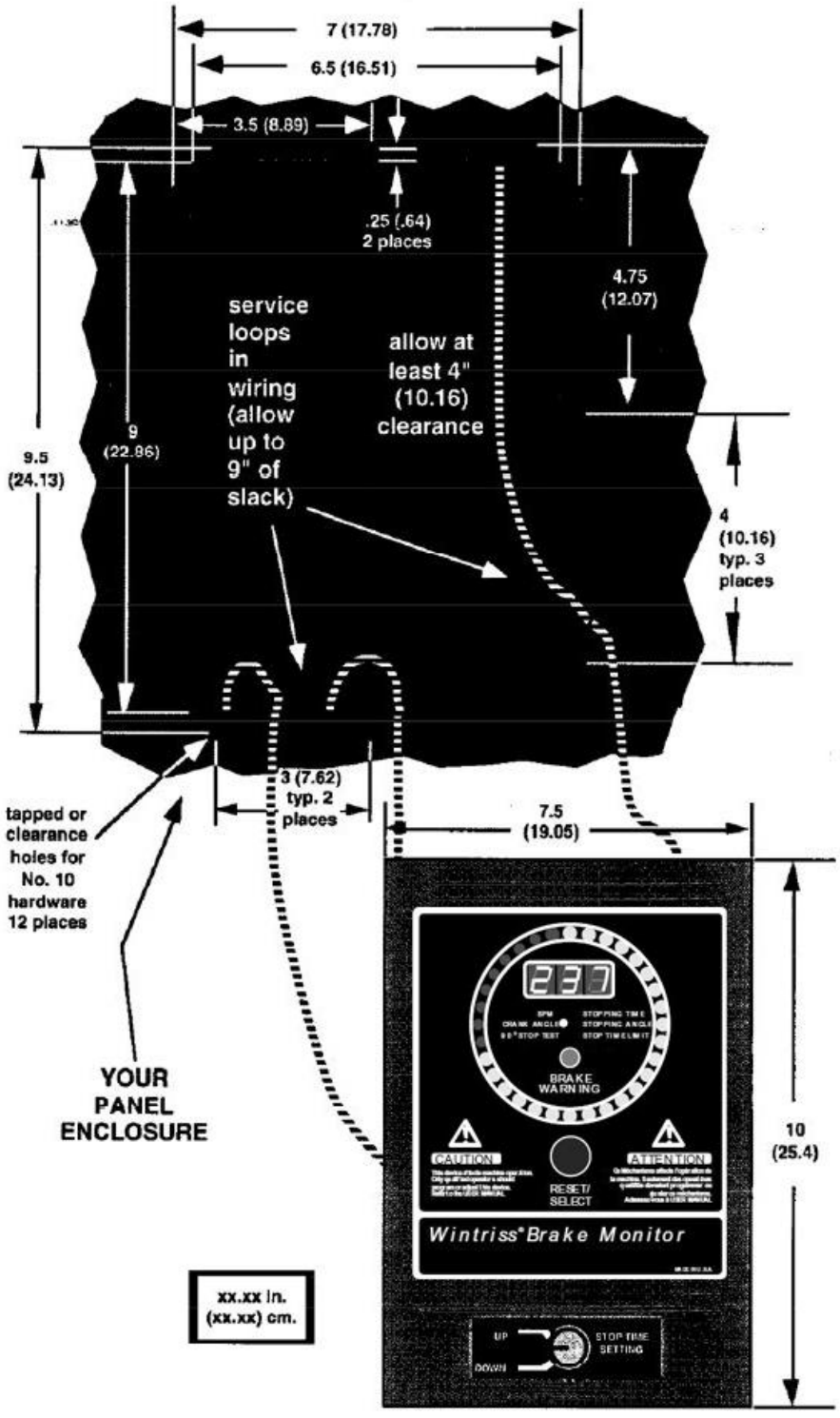

Figure C-1. Mounting and "cutout" dimensions

Index

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 1500	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 V Safety Light Curtain	DA71433	DA71449
Shadow VI Safety Light Curtain	DA71422	DA71445
Shadow VII Safety Light Curtain	N. A. *	1129400 *
Shadow 8 Safety Light Curtain	N. A. *	1139300 *
SmartPAC (w/ DiProPAC & ProCamPAC)	DA71439	DA71454
SmartPAC Hydraulic	DA71435	DA71451
SmartPAC Run Mode (Spanish)	N. A. *	DA71443
SmartPAC w/ WPC II Integration	DA71440	DA71455
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
WaveFormPAC (Advanced Load Analyzer)	DA71414	DA71443
Wintriss Brake Monitor	DA71432	DA71448
Wintriss Clock Display	N. A. *	DA67206 *
WPC II Wintriss Press Control	DA71438	DA71453
WPC 1000 Wintriss Press Control	DA71423	DA71446
WPC 2000 Wintriss Press Control	DA71421	DA71444
WPC 2000 Option 2	DA71408	DA71442

* 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.

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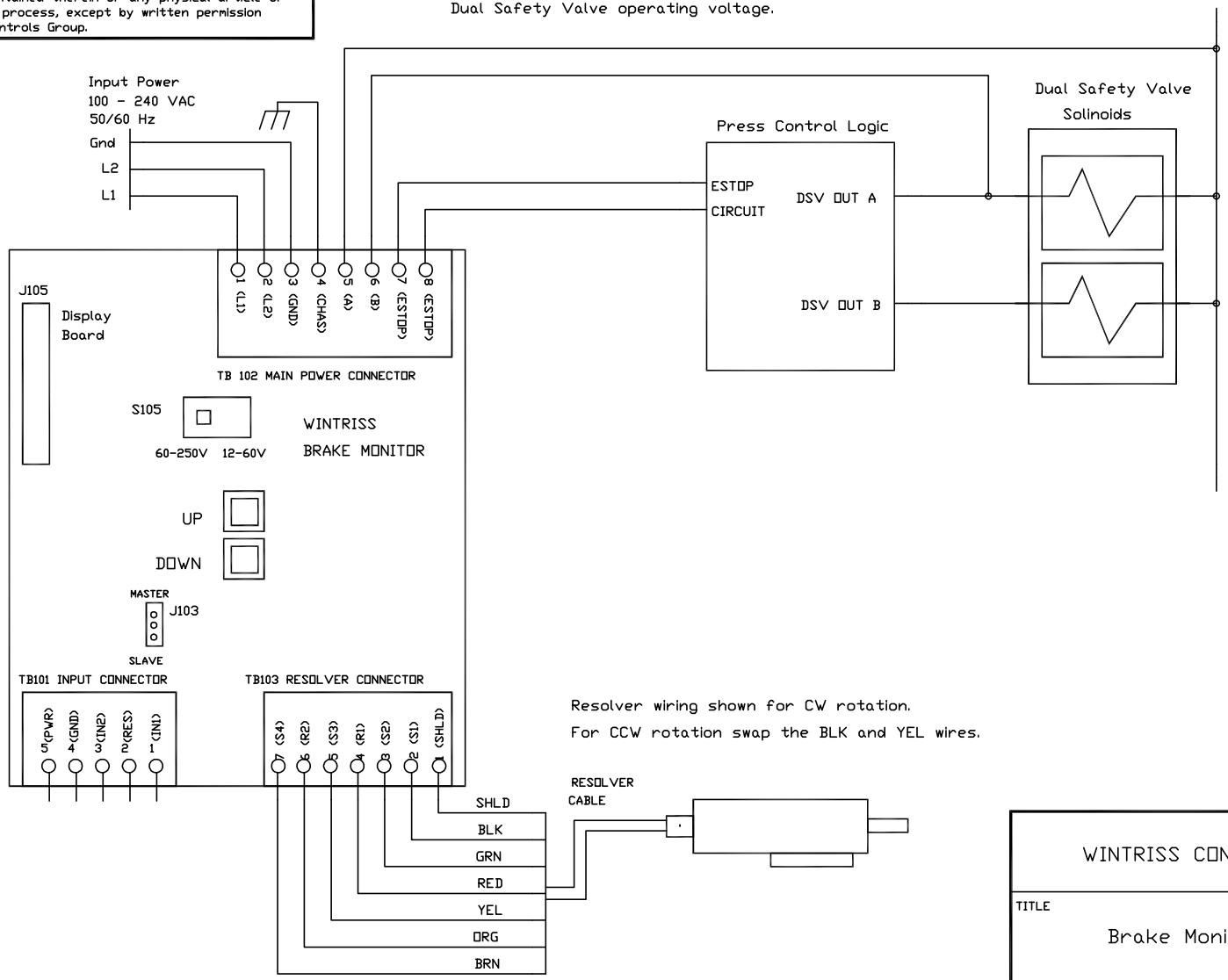
Note: Set S105 to the proper range to match the Dual Safety Valve operating voltage.



WINTRISS CONTROLS GROUP				
TITLE: Brake Monitor wiring diagram				
DRAWN: ADB		SIZE: B	DRAWING NUMBER:	REV:
DATE: 2/5/13			SHEET:	OF: