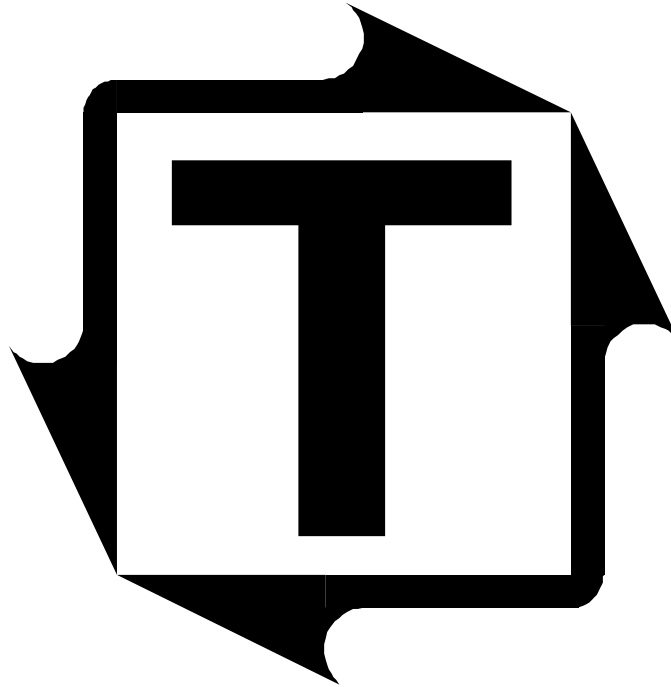# QUIK-LEARN™

Tonnage and Deviation Monitor

Toledo Integrated Systems

Toledo Transducers, Inc.

Installation and Operation Manual

QUIK-LEARN

Installation and

Operation Manual

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QUIK-LEARN

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QUIK-LEARN

Limited Warranty

This unit is warranted by the manufacturer, Toledo Transducers, Inc., to be free of defects in workmanship and materials for one year from date of manufacturer's shipment. This warranty is limited to repairing or replacing products which manufacturer's investigation shows were defective at the time of shipment by the manufacturer.

All products subject to this warranty must be returned for examination, repair or replacement
        F.O.B. to: Toledo Transducers, Inc.
                        6834 Spring Valley Drive
                        Holland, Ohio 43528

The express warranty set forth herein is in lieu of all other warranties, expressed or implied, including without limitation any warranties of merchant-ability or fitness for a particular purpose. All such warranties are hereby disclaimed and excluded by the manufacturer.

Repair or replacement of defective products as provided above is the sole and exclusive remedy provided thereunder. The manufacturer shall not be liable for any further loss, damages, or expenses, including incidental or consequential damages, directly or indirectly arising from the sale or use of this product.

Any unauthorized repair voids this warranty.

There are no warranties that extend beyond those expressly set forth herein.

QUIK-LEARN

Overview

The QUIK-LEARN is a two channel, compact, inexpensive and simple to use tonnage monitor. It is capable of displaying the load for both sides of the press as well as the total press tonnage. Both the left side and the right side displays have a bar graph that visually shows the deviation from the benchmark tonnage. This allows the operator to easily watch the repeatability of forming loads.

The QUIK-LEARN automatically sets high and low set points by using the percentage value from the **Tolerance Band** switch. When a load is detected to have exceeded either of these set points, the QUIK-LEARN's shutdown relay is opened, which in turn stops the press or alerts the operator. Low alarms may be disabled by toggling OFF the **Low Alarms** toggle switch.

Although small in size, the QUIK-LEARN has the computer interface capabilities found on the more advanced load monitors. This allows the monitor to be connected and controlled with a remote computer or PLC. Information such as tonnage signatures and plant-wide tonnage monitoring can be accessed by means of computer interfacing and software.
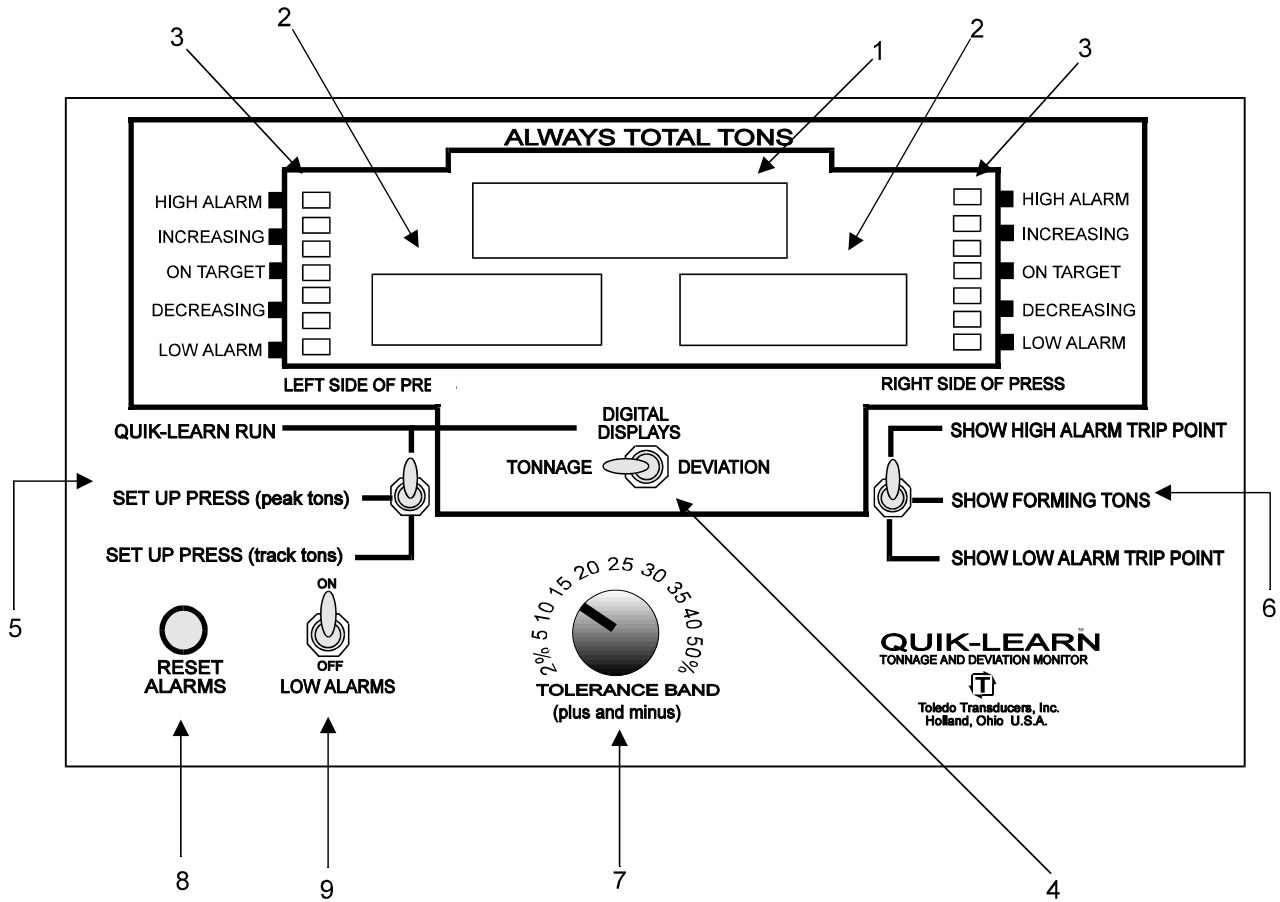
This manual provides instructions for rapid installation, set-up and calibration.

Going through the manual from the beginning to the end takes you through complete

> ⊠ *Installation*
>
> ⊠ *Calibration*
>
> ⊠ *Operator use*

QUIK-LEARN
Front Panel   **Figure 1**

I. Front Panel Description

Note: Refer to Figure 1, Page 4

1. **Total Tons Display**
   Displays the total tonnage of the left side and the right side of the press.

2. **Left Side and Right Side of Press Displays**

3. **Tonnage Deviation Indicators**
   Shows a bar graph deviation from the target tonnage. Each light represents 33% from the benchmark tonnage.

4. **Tonnage/Deviation Selection Switch**
   Allows the monitor to display either the actual forming load or the percent of deviation from the target tonnage. Optional information such as part count or snap-through loading is accessed from the middle switch position. A reference to Optional Features may be found on Page 25.

5. **QUIK-LEARN Operation Switch**
   Used to enter any of the three modes of operation:

   - QUIK-LEARN automatic
   - SET-UP PRESS (peak tons)
   - SET-UP PRESS (track tons)

6. **Show Alarm Points Switch**
   The user can display either:

   - High alarm set points
   - The low alarm set points
   - Forming tonnage

7. **Tolerance Band Switch**
   Allows the user to choose the percentage of the benchmark--or target load--to determine the high and low set points.

8. **Reset Alarms Button**
   If an alarm condition occurs and the press shuts down, normal operation can be resumed by pressing the reset button. This clears the alarm condition and closes the shutdown relay contacts, allowing the press to start up again. It continues to hold the last press cycle tonnage until the press is cycled again, even if power is cycled OFF and ON.

9. **Low Alarms Switch**
   This switch allows the low set points to be disabled. This prevents low loads from opening the shutdown relay and stopping the press. If low loads or empty press strokes can be tolerated, this switch should be OFF.
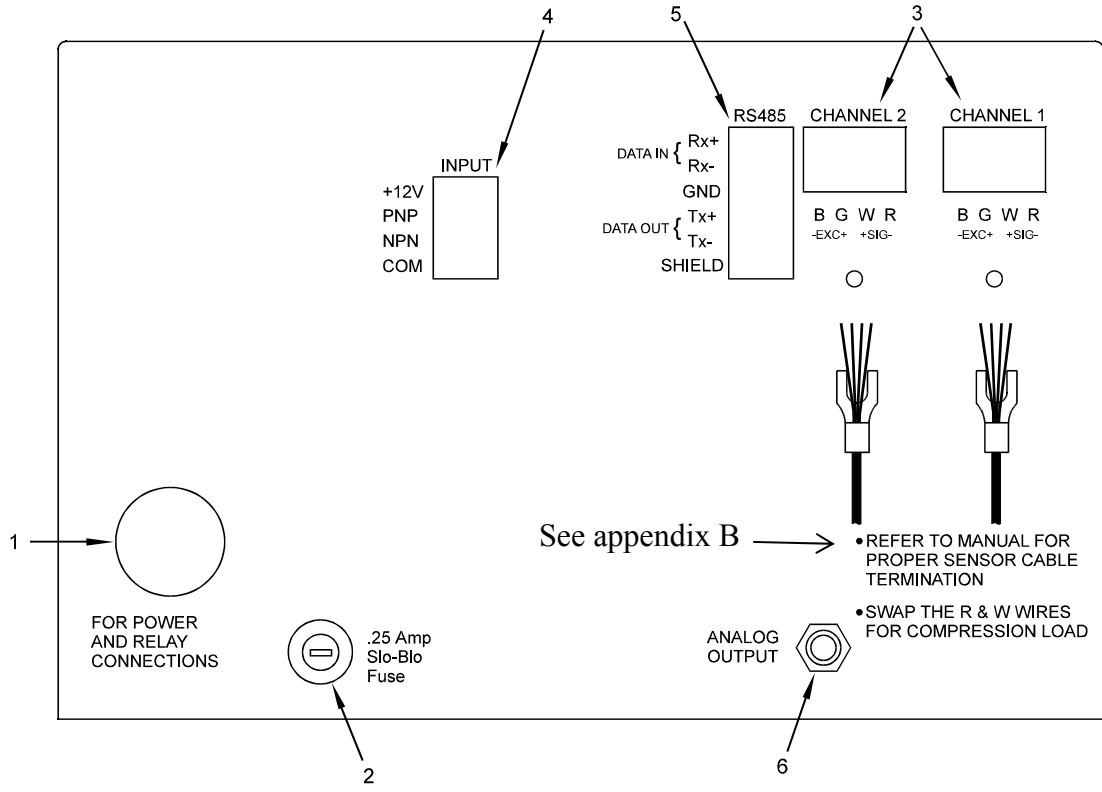
QUIK-LEARN
Rear Panel   **Figure 2**

II. Rear Panel Description

Note: Refer to Figure 2, Page 6

1. AC Power and Relay Access

A 7/8" conduit hole for power and relay wires.
Power input = 85 to132 VAC 50-60 Hz with good earth ground.
See inside rear view (page 10) for wire connection location.

2. Fuse

0.25 amp (Slo-Blo) (5mm x 20mm)

3. Sensor Inputs

Connect T400 sensors according to the color code for sensors in tension. If mounted for compression loads, reverse the red and white wires. Pass the cable through the spade lug and crimp lug to shield, SEE APPENDIX B. Fasten spade lug to enclosure with 6-32 x 1/4" screw.

4. Cam/Probe Input

Accepts NPN or PNP proximity device. A limit switch may also be used.
The QUIK-LEARN supplies +12VDC to those devices needing external power.

5. Computer Interface

RS485 multidrop interface.

6. Analog Output Jack

This jack provides electrical signals that are directly proportional to the load. This signal can be viewed using an oscilloscope or track recorder. (2.5 VDC = Capacity in each Channel.)
See Figure 3 below.
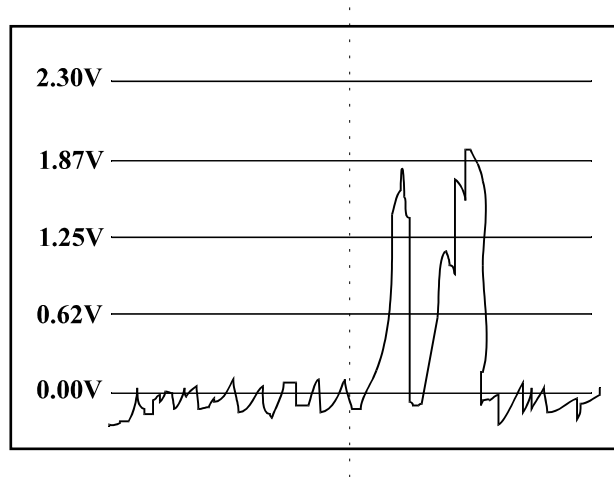
QUIK-LEARN
Typical Signal from Analog Jack   **Figure 3**

Standard Monitor Dimensions

8.50

5.50

5.50

7.85

SENSOR CONNECTIONS
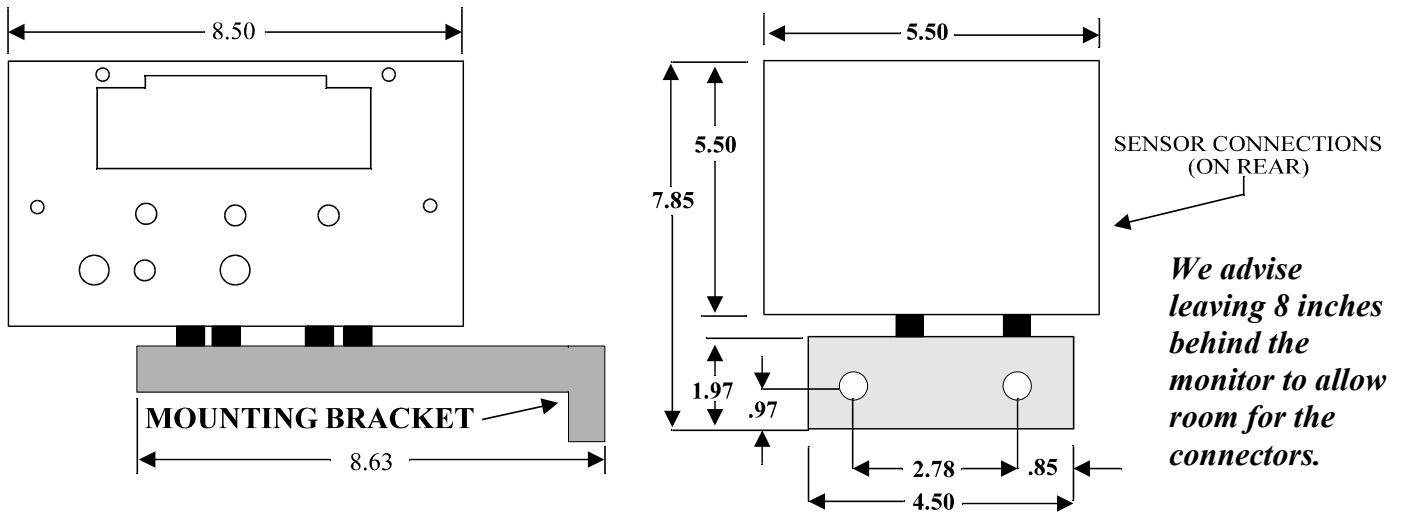(ON REAR)

We advise leaving 8 inches behind the monitor to allow room for the connectors.

MOUNTING BRACKET

8.63

1.97

.97

2.78   .85

4.50

Note: All dimensions are in inches.

Special Flush Mounting Dimensions

TOP VIEW

(4) 1/4-28 x 1" BUTTON SOC HD CAP SCR
(4) 1/4" LOCK WASHER
(4) 1/4-28 HEX NUT

OUTLINE OF ENCLOSURE

9.125
HOLE CENTERS

8.500
PRESS CUT OUT

6.312
HOLE CENTERS

5.562
PRESS CUT OUT

PRESS MODIFICATION

(4) 17/64 DIA. HOLE

FRONT VIEW

SIDE VIEW

OPTIONAL FRONT MOUNTING
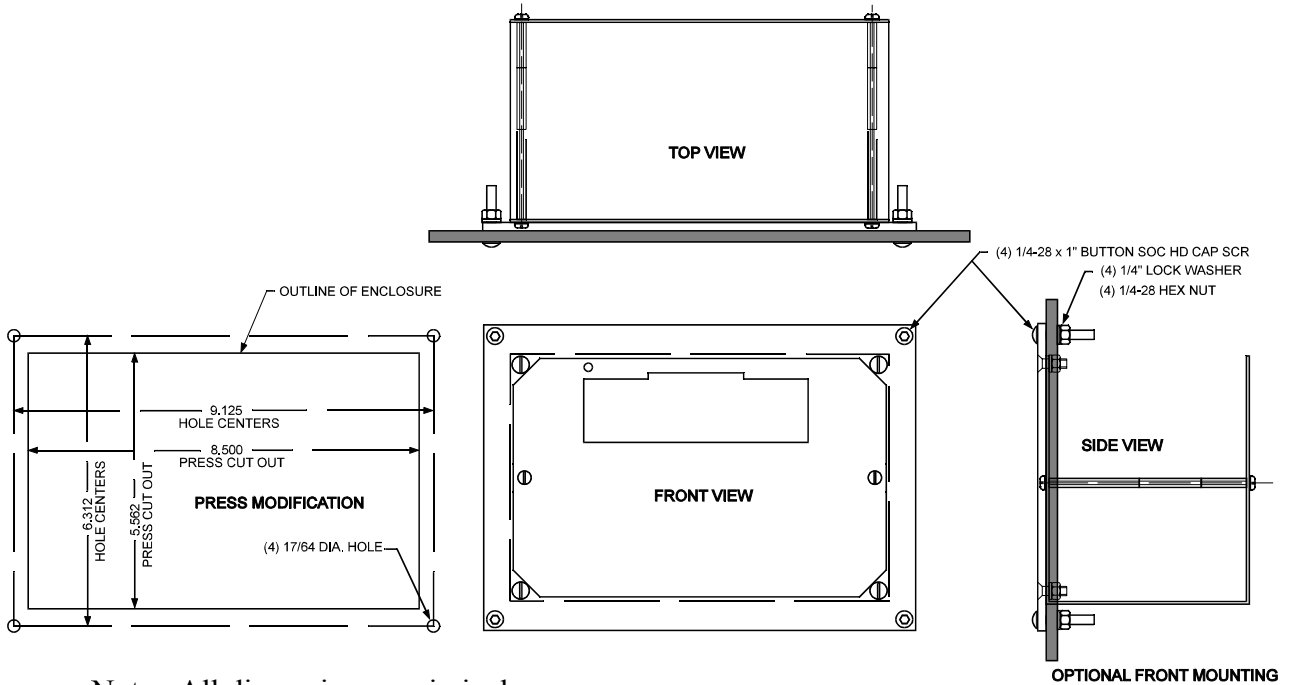
Note: All dimensions are in inches.

QUIK-LEARN
Monitor Dimensions   **Figure 4**

III. Installing the QUIK-LEARN

Step 1.   Install the QUIK-LEARN mounting bracket near the operator control panel, where the QUIK-LEARN can be easily seen and used, making sure the unit is out of the way of potential damage.   Leave at least eight inches of room behind the unit for rear panel wiring connections.

See Figure 4 on page 8. The mounting bracket includes additional holes. These allow you to adjust the angle of the monitor.

Step 2.   Install the sensor(s) according to the **T400 Sensor Installation Instructions in APPENDIX A**. The sensor cables do not necessarily need to be run in conduit unless the cables will be in an area where they could be damaged.   They are designed to be electrically noise-free, as long as there are no cuts or splicing done to the cable.

If you use conduit, a termination bracket must be specially made to bring the conduit into the back of the QUIK-LEARN**.**

If you have custom designed load cell(s) that fits into your press; the T400 Sensor Installation Instructions do not apply. When routing your sensor cable, make sure it does not snag anything as the press cycles. To prevent a weak spot, make sure it does not kink or bend in any one area.

Choosing Compression or Tension

- If the sensors are being placed on the columns of a straight side press, the sensor will be stretched or elongated in tension.

- Sensors placed on the Pitman arms or in the rear of a C-Frame press will be compressed.

- When connecting the sensor cable to the QuikLearn, the sensor's red and white wires need to be reversed if you are using compression. **See APPENDIX B for sensor cable connection.**

III. Installing the QUIK-LEARN
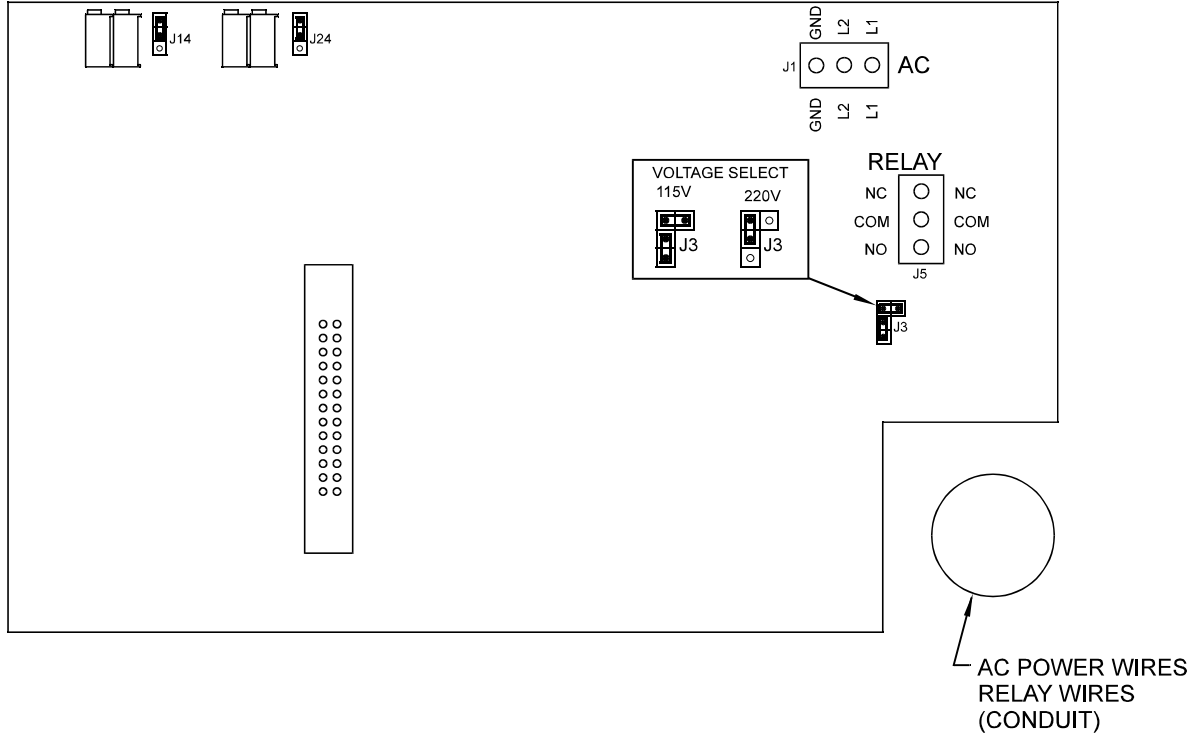
QUIK-LEARN
Inside Rear View   **Figure 5**

III. Installing the QUIK-LEARN

Step 3.   The unit operates on 85 to 132 VAC and power is terminated inside the enclosure. See Figure 5, Page 10. "L1" is the "HOT" power terminal (fused) and "L2" is the neutral. Jumper J3 maybe changed to allow 220 VAC operation. See figure 5.

The power input must be properly grounded to the press or a good earth ground. This is especially critical in forging applications where induction motors can induce electrical noise.

Step 4.   The Top Stop relay from the press should be connected to the shutdown relay connector inside the enclosure. See Figure 5, Page 10. This 3-pin terminal block is removable. In most cases, the common (C) and normally open (NO) are wired into the top-stop circuit of the press. This contact is held closed and opens when an alarm occurs. These contacts have a 10-amp rating at 120 VAC.

⊠   *If controlling a motor of more than 10 amps, another relay should be put into the circuit.*

Step 5.   We recommend connecting a cam or proximity switch to trigger the unit when it should look for tonnage. See Figure 6, Page 12, for proper connection of cam input.

We recommend that the cam turns ON at 150 degrees and OFF at 220 degrees when you want the monitor to read the peak tonnage developed during a stroke of the press.

Without a cam or proximity switch, it may give double readings for one stroke. This is especially true with dies that have more than one function or station. See Figure 3, Page 7. This signature shows piercing, forming and striping. It causes double updates unless a cam switch is used.
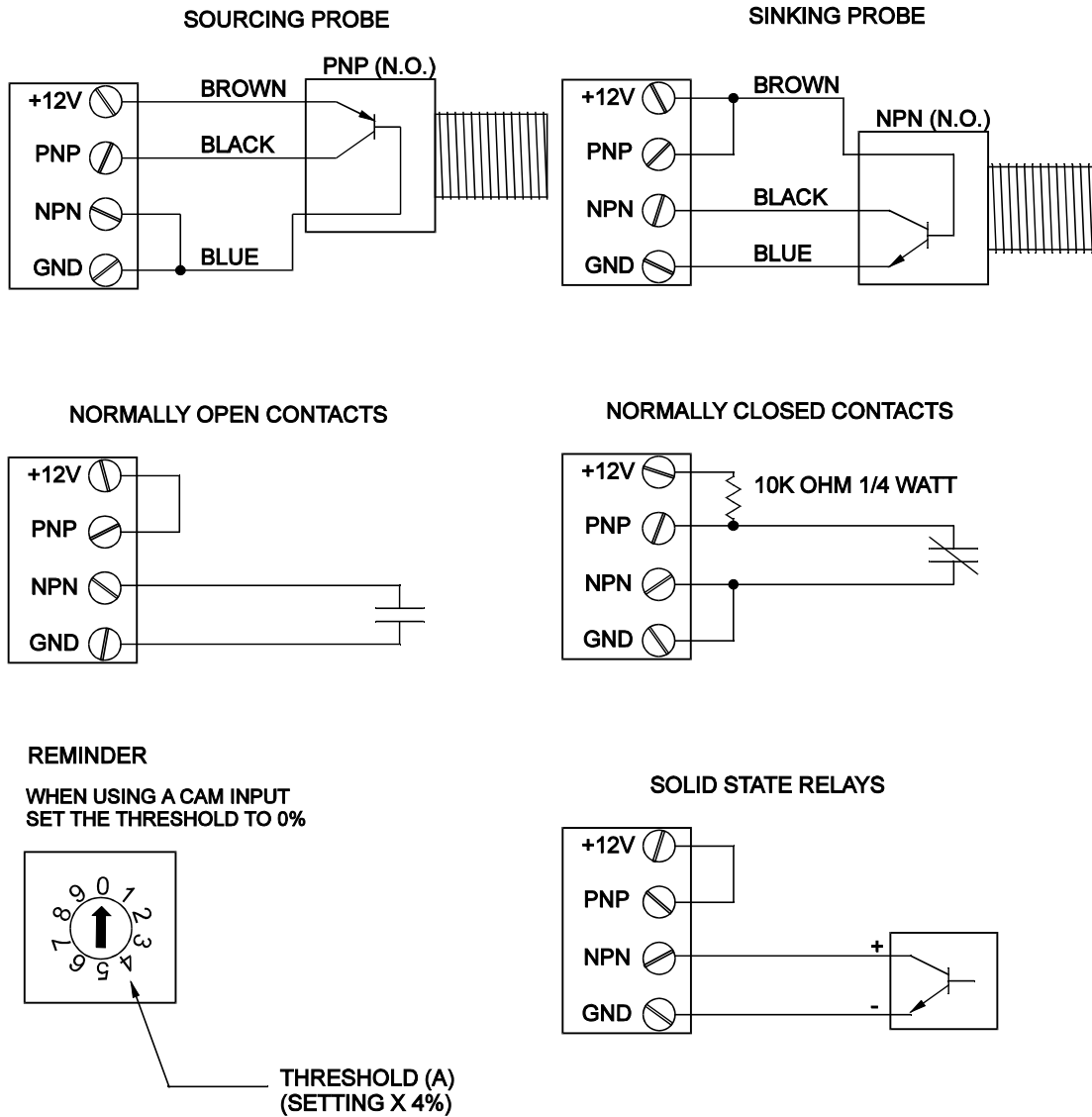
⊠   *When using cam input, move threshold setting to "0" to tell monitor to use cam switch.*

III. Installing the QUIK-LEARN

To prevent electrical noise from entering the Quik-Learn unit through the probe input, a shielded type cable must be used, and must be grounded to the press or PLC controls.

QUIK-LEARN
Cam Switch Wiring Connections   **Figure 6**

III. Installing the QUIK-LEARN

Step 6.   The RS485 plug is used for connecting either an RS232 or an RS485 computer interface to the QUIK-LEARN. For wiring instructions, see Figure 7, Page 14.

⊠   *Cable shield connection must be continuous from end to end or electrical noise may damage your computer.*

⊠   *Use Belden #8103 or equivalent interface cable (TT# 2038-222).*

Step 7.   The QUIK-LEARN is protected by a 0.25 amp Slo-Blo fuse on the rear panel. If replacement becomes necessary, an identical fuse must be used.
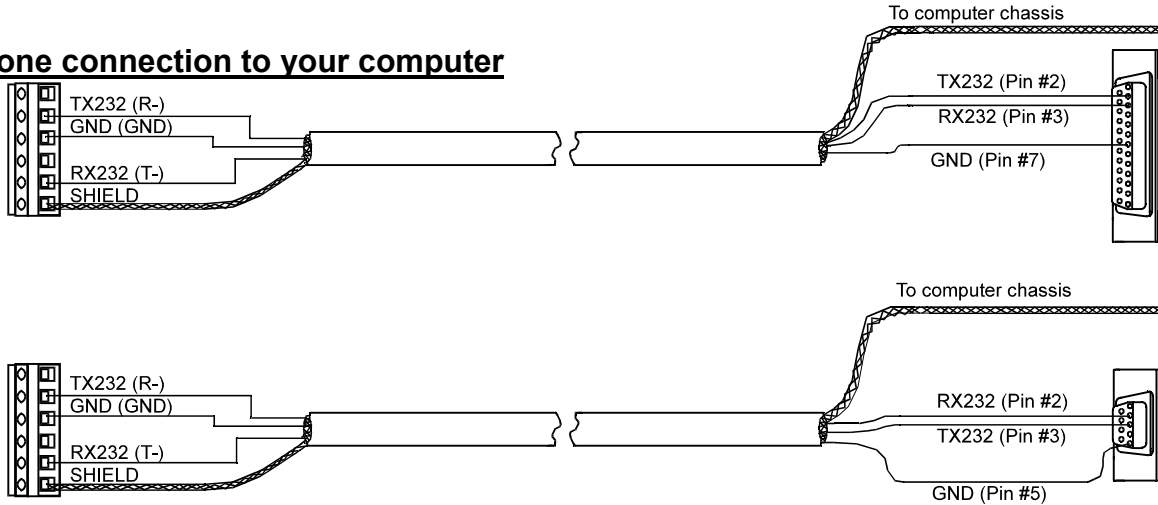
The size of the fuse is 5mm x 20mm.

Step 8.   Each time the QUIK-LEARN is powered up, all LED's and displays light up for approximately one second, then a four-digit number is displayed. This number is the ROM used to determine the firmware version of the internal program.
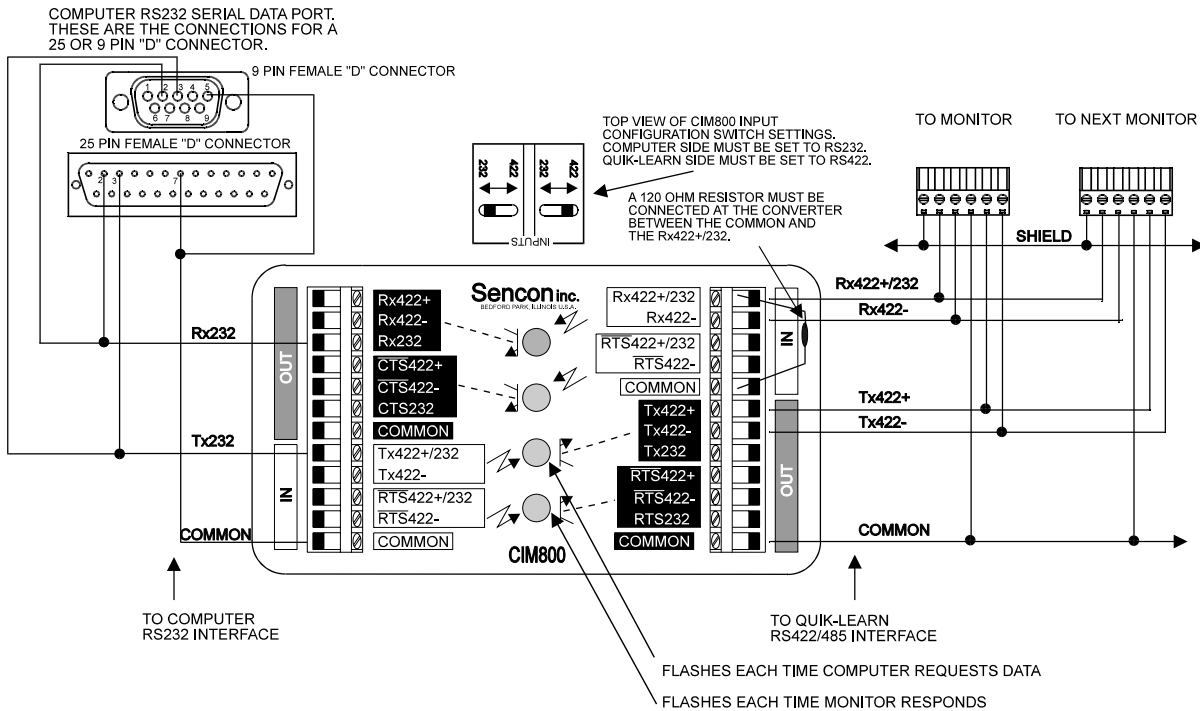
The monitor is also auto-zeroing the sensor inputs. When auto-zeroing, it shows horizontal lines ----------------. When completed, the relay closes and the unit awaits a press cycle.

III. Installing the QUIK-LEARN

For one connection to your computer

To computer chassis

TX232 (R-)
GND (GND)
RX232 (T-)
SHIELD

TX232 (Pin #2)
RX232 (Pin #3)
GND (Pin #7)

To computer chassis

TX232 (R-)
GND (GND)
RX232 (T-)
SHIELD

RX232 (Pin #2)
TX232 (Pin #3)
GND (Pin #5)

For plant-wide connection to the monitor

COMPUTER RS232 SERIAL DATA PORT.
THESE ARE THE CONNECTIONS FOR A
25 OR 9 PIN "D" CONNECTOR.

9 PIN FEMALE "D" CONNECTOR

25 PIN FEMALE "D" CONNECTOR

TOP VIEW OF CIM800 INPUT
CONFIGURATION SWITCH SETTINGS.
COMPUTER SIDE MUST BE SET TO RS232.
QUIK-LEARN SIDE MUST BE SET TO RS422.

A 120 OHM RESISTOR MUST BE
CONNECTED AT THE CONVERTER
BETWEEN THE COMMON AND
THE Rx422+/232.

TO MONITOR   TO NEXT MONITOR

INPUTS

Rx232

Tx232

COMMON

IN

OUT

Sencon inc.
BEDFORD PARK, ILLINOIS U.S.A.

Rx422+
Rx422-
Rx232
CTS422+
CTS422-
CTS232
COMMON
Tx422+/232
Tx422-
RTS422+/232
RTS422-
COMMON

Rx422+/232
Rx422-
RTS422+/232
RTS422-
COMMON
Tx422+
Tx422-
Tx232
RTS422+
RTS422-
RTS232
COMMON

IN

OUT

Rx422+/232
Rx422-

Tx422+
Tx422-

SHIELD

COMMON

CIM800

TO COMPUTER
RS232 INTERFACE

TO QUIK-LEARN
RS422/485 INTERFACE

FLASHES EACH TIME COMPUTER REQUESTS DATA

FLASHES EACH TIME MONITOR RESPONDS

QUIK-LEARN
232/485 Connections to Computer Chassis   Figure 7

Connection information of the converter:
- Selector switches on the top of the converter should be set to 422 on the monitor side; 232 on the computer side.
- A 120 Ω resistor must be connected at the converter between the common and the RX 422+/232.
- The third LED from the top flashes every time the computer asks for information. The bottom LED flashes when the monitor responds.

IV. QUIK-LEARN Initial Set Up

Step 1.   QUIK-LEARN Capacity Setting

- The capacity of the press should be entered into the unit. Refer to Figure 8 on Page 18 for the location of the capacity switches.

- The switch on the left is for the 10's column and the switch on the right is for the 100's column.

  For example, to enter 50 tons set the left switch to 5 and the right switch to 0. For 200 tons, set the left switch to 0 and the right switch to 2. The 1's column is assumed to be zero.

- The maximum capacity is 990 tons.

- If a higher capacity is needed, a special program is required to ignore the decimal point.

Step 2.   Threshold Setting

- If a cam input is not used to trigger the QUIK-LEARN, a threshold setting must be entered. Figure 8 on Page 18 also shows the location of the threshold switches. There are 10 settings (0-9) and each setting is multiplied by 4%. Thus, a setting of 2 means that 8% of tonnage triggers the unit.

⊠ *If a cam input is used, set the threshold to 0 to tell the unit to look for a cam signal.*

Step 3.   Computer Addressing

- If the computer interface option has been installed and there is more than one QUIK-LEARN on the same serial line, each unit must be given a five-digit address (0-31).

⊠ *Use switches 4-8 of the computer address switch bank. See Figure 9, pg 19.*

Step 4.   Time Delay Setting

- A time delay setting can be used when the QUIK-LEARN is triggered by a threshold value. When the time delay is set, the QUIK-LEARN begins counting when the tonnage passes above the threshold value (see Step 2 above). The stroke will not terminate until the time delay expires. This is used for cases where the tonnage rises and falls more than once during the stroke (sometimes called a "double hit"). This may cause the QUIK-LEARN to update twice in the same stroke. Follow the guidelines below when setting the delay value:

< 60 SPM	→	1 second delay
60-200 SPM	→	250 ms delay
200-650 SPM	→	62 ms delay
> 650 SPM	→	Use probe triggering.

⊠ *Use switches 2 & 4 of the auxiliary switch bank. See Figure 9, pg 19.*

Step 5. **Percent of Benchmark or Capacity Selection for Tonnage Limits**

- This selection determines the method that the Quik-Learn will use to calculate its tonnage limits.

- When using Percent of Benchmark, the percentage on the tolerance band is applied to each channel's benchmark tonnage to determine the high and low alarm trip points. This setting works best for a moderate to high working tonnage with respect to the channel's capacity.

- When using Percent of Capacity, the percentage on the tolerance band is applied to each channel's capacity to determine the high and low alarm trip points. This setting works best for jobs with light working tonnage with respect to the channel's capacity.

   For example, a stamper is making a good part at 4 tons on his 60 tons press. 2 tons on each side is shown on his displays. If Percent of Benchmark is used, and the maximum tolerance band setting of 50% is selected, the trip points will be calculated as follows: Benchmark of 2 tons multiplied by 50% = 1 ton. If the tonnage varies more than 1 ton without a quality problem, it will shut down the press excessively. Percent of capacity would be an option in this case.
   If Percent of Capacity is used, and the maximum tolerance band setting of 50% is selected, the trip points will be: Capacity of 30 tons multiplied by 50% = 15 tons. This allows for a much wider range of available trip point settings (as low as ± 0.6 tons at 2% or as high as ± 15 tons at 50%).

⊠ *Use switch 1 of the auxiliary switch bank to configure this setting. See Figure 9, pg 19.*

Step 6. **Setup Count Setting**

- Normally, the Quik-Learn allows the press to run in setup mode with the alarm trip points disabled as long as the operation switch is in the SET UP PRESS position. If this is not desired, a Setup Count can be configured. This function counts the number of strokes that the machine runs while the Quik-Learn is in setup mode. If the Setup Count is exceeded, the Quik-Learn will open the shut down relay and stop the press. The bargraph LEDs for both channels will flash to alert the operator that the unit was left in setup mode. To clear the alarm, press the RESET button.

⊠ *Use switches 1 & 2 of the computer address switch bank. See Figure 9, pg 19.*

Step 7.   Repeatability Mode Setting

- Sometimes it is desirable to allow for a gradual change in forming tonnage over time, provided that this drift does not result in quality problems. Repeatability Mode allows for small changes in forming tonnage while still providing protection for major events. In Repeatability Mode, the Quik-Learn recalculates its benchmark and high/low alarm trip points every stroke, based on the average of the past 8 strokes.

- When switching from Setup to Run Mode, the benchmark is the last load from Setup Mode. The average (benchmark) is the same as having had 8 loads the same as the last Setup load. This means that the benchmark is weighted toward the last Setup load for the next 8 strokes until the average buffer is filled with new data.

⊠ *Use switch 3 of the computer address switch bank. See Figure 9, pg 19.*
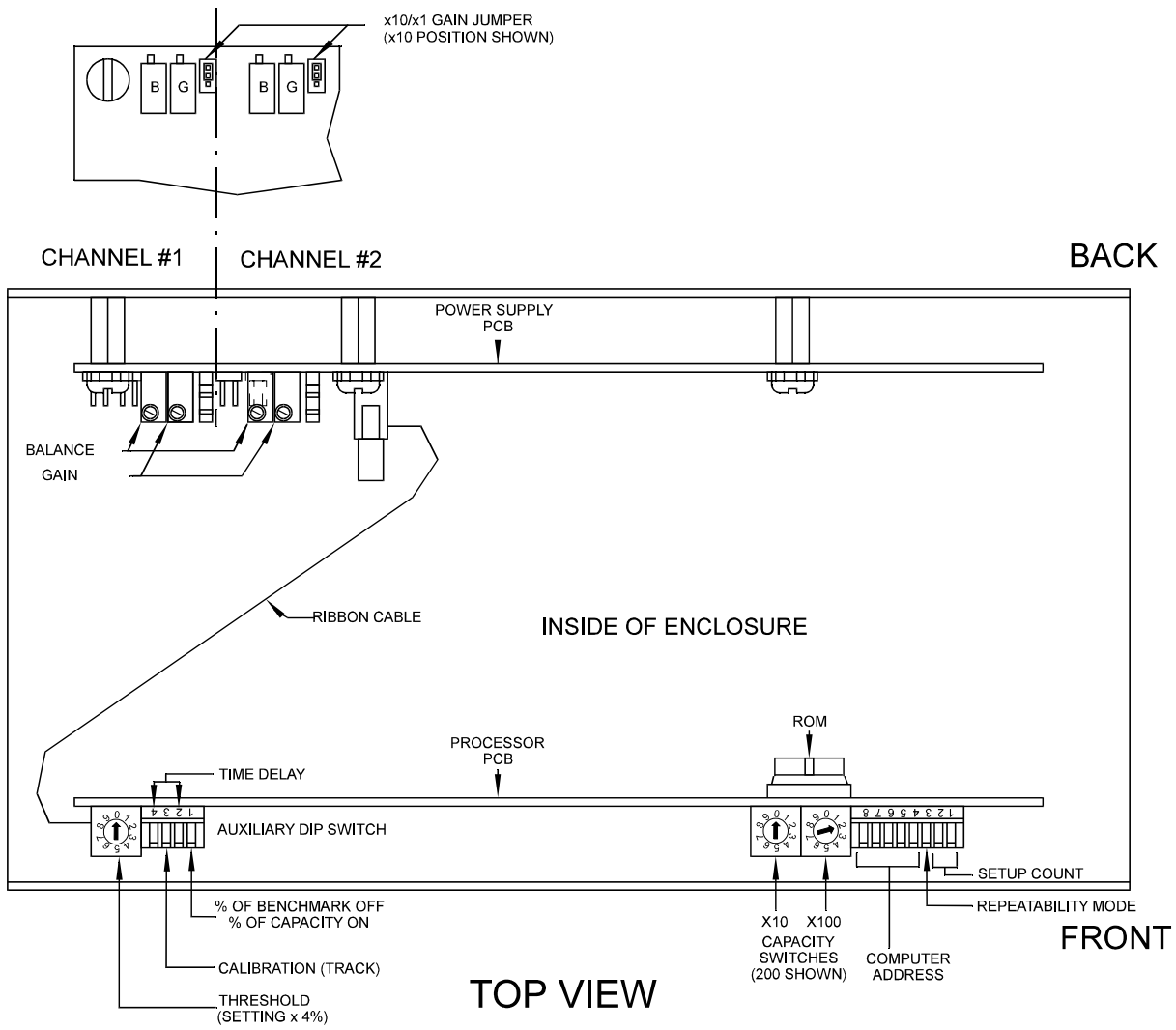
QUIK-LEARN
Capacity & Threshold Settings   **Figure 8**
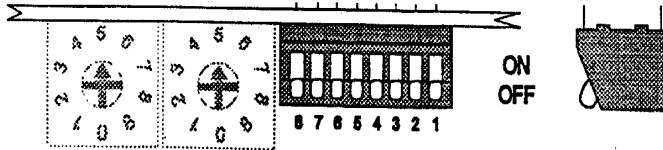
SWITCHES ABOVE SHOWN IN OFF (OPEN) POSITION

QUIK-LEARN
Computer Address, Setup Count, & Time Delay Selection

Figure 9

V. QUIK-LEARN Press Calibration Procedure

Step 1.   Choose the best sensor and unit location. If the front of an O.B.S. press is 3 1/2 times thicker than the back, place the sensors in the back. If placed in the back, they should be in compression instead of tension. Install and use 150 in./lb. or 12.5 ft./lb. for the torque on the sensor screws.

This should have been done already in Step 2 of **Installing the QUIK-LEARN** section beginning on Page 9.

Step 2.   Record shut height of the press and the serial numbers of the load cells and load monitor. The Toledo Transducers Field Engineers use the **Press Calibration Data Sheet** located on the last page of this manual. You may wish to copy this and use it for data collection.

Step 3.   Connect the top stop relay.

Step 4.   Enter the total capacity of the press into the QUIK-LEARN**.**

Step 5.   Connect a cam switch—if a cam switch is available—to trigger the unit and adjust the threshold to "0".

Step 6.   Without load cells in the press, cycle the press and stop it at BDC. Measure between the ram and the bed to determine the size of the spacers needed. Be careful to allow at least a 1/8 inch gap between the ram and the load cells.

⊠   *Damage to the press could occur if the ram locks up on the load cells due to an improper measurement.*

Step 7.   Cycle the press so the ram goes to the top. Insert the load cells and spacers. Keep the load cells symmetrical with each other in the bed of the press. Record their placement within 1/4 inch on a calibration sheet.

Step 8.   Cycle the press—lowering the ram each time—until you reach the tonnage rating capacity of the press.

⊠   *The load will increase approximately 1 ton for every 1/1000 inch as you begin to lower the ram.*

Try to obtain an even tonnage on each load cell once you are at the capacity of the press. You can shim using paper--1 ton per sheet of notebook paper.

Fox example, if you are calibrating a 200 ton OBI press, you will want to achieve 100 tons on each side of the press. If your ram is not level, you will see an unbalanced loading. To balance, you can place a piece of notebook paper on top of a load cell, and see the tonnage increase by approximately 1 ton.

V. QUIK-LEARN Press Calibration Procedure

Step 9. Once you have evened out the tonnage at capacity, you are ready to adjust the readings in the QUIK-LEARN. Figure 8 on Page 18 shows the location of all the internal switches needed.

Put the unit in calibration mode by flipping dip switch #3 back, located next to the threshold switch, to ON and adjust the balance pots of both channels until both displays read nearly zero. Flip dip switch #3 forward (OFF), press reset and cycle the press.

Make the QUIK-LEARN read the same as the load cells, within 98% or closer, by adjusting the gain pots. The QUIK-LEARN should match the load cell readings. Turning it clockwise adjusts the gain higher. There is a x10/x1 jumper that can be adjusted depending on how much gain you need.

After you adjust the gain, cycle the press to see the results of your adjustments. Keep adjusting and cycling until the QUIK-LEARN matches the load cell's tonnage.

Step 10. Once the calibration is complete, back off the ram adjustment little by little and record the results. This should be done at least 4 times to see the accuracy at lower tonnage. We call this the "linearity check."

(100%, 75%, 50% and 25% of capacity.)

Step 11. Cause the unit to alarm by flipping it to QUIK-LEARN Run mode and vary the tonnage by adjusting the ram.

Does it stop the press after an alarm? If not, the wiring of the shut down relay should be checked.

Step 12. Remove the load cells and install the die. The production run may now begin. If you see erratic readings, check the cam switch timing. It should be ON from at least 4 o'clock to 7 o'clock, 160 degrees - 200 degrees in the stroke. If you are not using a cam switch, consider adjusting the threshold to 4 or 5 (16 - 20 percent of capacity)

Step 13. Put the unit back into the calibration mode as in **Step 9.**

Push in the reset button and record the numbers shown. These are the calibration numbers. Record them in the lid of the QUIK-LEARN and also on the calibration sheet for your files. Flip dip switch #3 forward (OFF) and record any other switch settings on the lid of the unit.

Step 14. Put the four screws back in the unit to secure the cover. The calibration is complete.

VI. Operator's Guide
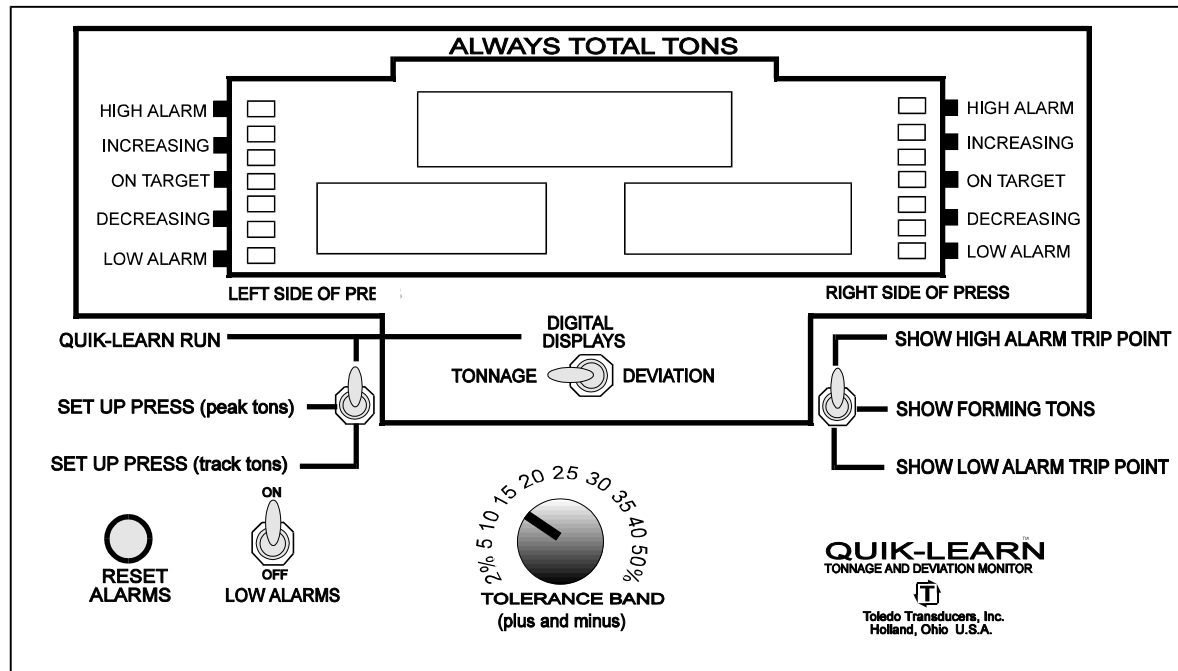
- While setting a die in the press, switch the QUIK-LEARN to SET UP PRESS (peak tons) and run material through. After a good part is formed, switch to QUIK-LEARN AUTOMATIC.

- Once turned to QUIK-LEARN Automatic, it takes the last tonnage seen in SET UP PRESS and makes it the benchmark tonnage. It compares following hits during the production run with this benchmark tonnage. The QUIK-LEARN establishes high and low set points based on the percentage setting of the TOLERANCE BAND SWITCH. It sets them around the benchmark tonnage.

- The HIGH and LOW set points can be displayed by toggling the SHOW ALARM POINTS SWITCH. If an alarm occurs, the display will flash on the side of the press on which the alarm occurred.

- To clear an alarm, press the RESET ALARMS button. This closes the contact of the relay to allow the press to cycle. The last press cycle continues to show on the displays until the press cycles again.

- Low alarms can be disabled by turning the LOW ALARMS switch to the OFF position.

- To avoid nuisance alarms and shutdowns while adjusting the press, put the QUIK-LEARN in SET UP PRESS (peak tons) until the adjustment has been made. This mode still protects the press on a beyond capacity of press hit by opening the relay and flashing an alarm. It will not shut the press down under the capacity of the press. This switch position disables HIGH & LOW alarm settings, but shuts down the press if capacity is exceeded.

VII. Specifications

Analog Signal Output	1/4 inch stereo phono jack (0-2.5vdc + maximum capacity of display per channel)
Automatic Zero Balance	Auto-zero circuit maintains true zero during periods between measurements. This assures sensor and instrument accuracy regardless of ambient temperature excursions.
Calibration Shunt	1 Megohm .1% precision shunt resistor
Cam Input	Accepts 10 to 24 VDC NPN of PNP proximity device. Supplies +12VDC at 45 mA maximum. Limit switch may also be used.
Computer Interface	RS485 multidrop interface; PressNet 2.0, PressNet 4 and TTGraph compatible
Display	Four digit display for a total measurement
Enclosure Dimensions	8.5 inches wide x 5.5 inches high x 5.5 inches deep
Enclosure Mounting	Mounting bracket allows the enclosure to be positioned at every 30 degrees. Flushmount enclosure is also available; see Page 8.
Frequency Response	Flat to 1kHz
Gain / Span Ranges	Two span ranges to allow either weak or strong signals from the load sensor. Low range provides a continuous variable gain range from 40 mv/v to 4400 mv/v. Each channel has a separate span of gain pot. This range is adjustable by a 25-turn potentiometer inside the unit.
Instrument Weight	Approximately 8.5 pounds
Manual Zero Balance	Manual zero balance range is +/- 1 mV/V of offset at the transducer input and is adjustable by a 25 turn trimming potentiometer for each channel.
Operating Temperature	0 degrees to 70 degrees Celsius
Power Requirements	85 to 132 VAC 50-60 Hz 200 mA maximum

Probe Input   Accepts NPN or PNP proximity device (supplies 12 VDC @ 45 mA maximum), a limit switch may also be used. This probe input tells the unit when to read tonnage.

Relay Output   1 form c contact, 10 amp rating at 120 VAC

Sensitivity   0.057 mv/v to 6.25 mv/v input

Sensor Excitation   10VDC at 125 mA maximum

Sensor Inputs   1-4 350 ohm wheatstone bridge strain sensors

Speed   0-400 SPM using threshold to trigger
         0-2000 SPM using probe to trigger

Tension   Tension is the reading of force by the sensor or load cell elongating (stretching) apart. Front of a C-Frame press or on a column of a straight side press usually uses the tension forces.

Threshold   Threshold is the starting point that triggers the monitor to begin reading a tonnage. It is a force value that allows the unit to recognize a cycle. The monitor will ignore all forces under threshold.
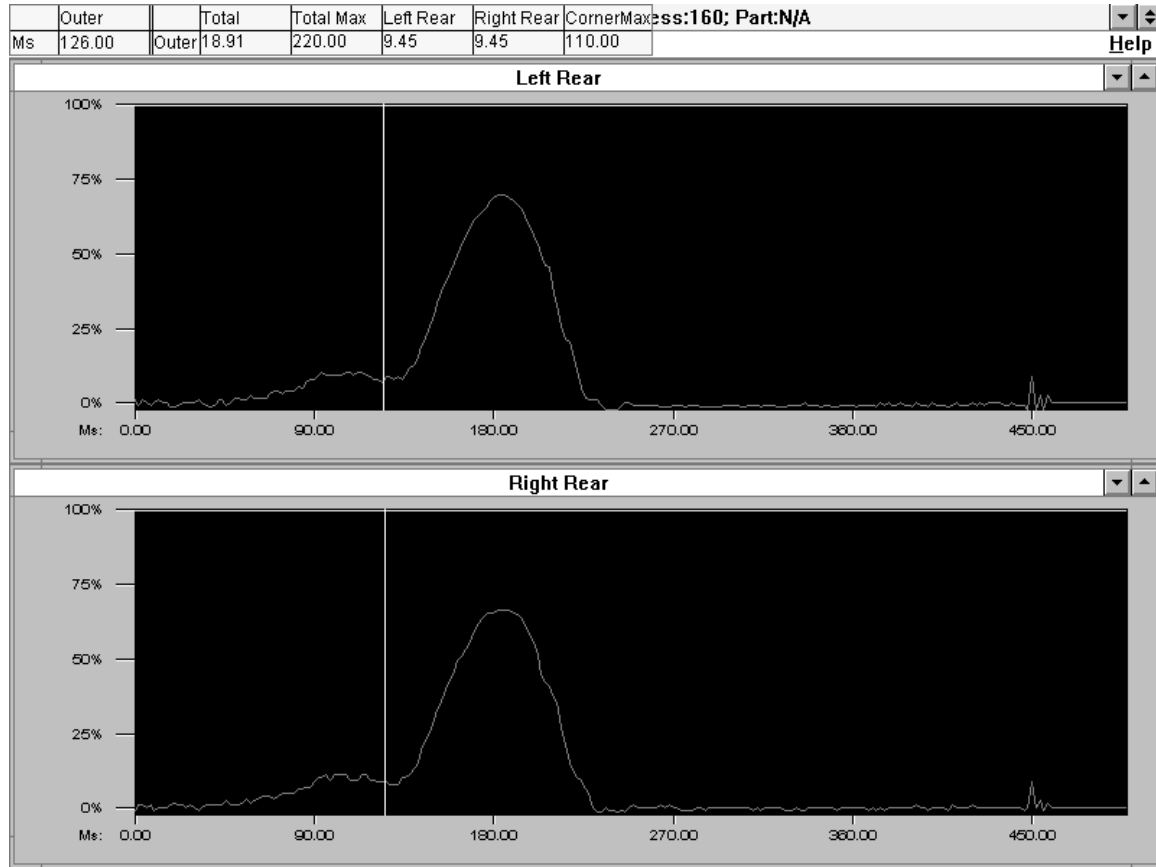
VIII. Optional Features

QUIK-LEARN options:

- TT Graph Software (Page 26)

- PressNet Software (Page 27)

- Reverse Mode (Page 28)

- Count (Page 28)

- Flushmount (Page 28)

- Above 990 Ton Press Applications (Page 28)

TTGraph software allows you to download a time-based signature of the last stroke.

QUIK-LEARN
TTGraph Software Screen   **Figure 10**

- **PressNet** software allows you to monitor up to 32 QUIK-LEARN tonnage monitors from a central computer.

QUIK-LEARN
PressNet Software Screen   **Figure 11**

• **Reverse** mode is used to display the snap-through tonnage values that occur during blanking operations. When this option is added, the "Tonnage" / "Deviation" selector switch is replaced with a three position switch and becomes "Tonnage" / "Reverse" / "Deviation".

   To see the reverse tonnage of the last cycle, switch to the "Reverse" position or you can leave the switch in the "Reverse" position and cycle the press. When in this mode, no alarms are active.

⊠ *This option requires the use of a cam switch to trigger the unit.*

• The **Count** option is a stroke counter that counts all strokes of the press that trigger the monitor to take a tonnage reading. With this option, the "Tonnage" / "Deviation" switch is replaced with a three position switch and it becomes "Tonnage" / "Count" / "Deviation".

⊠ *The Reverse option and Count option cannot be incorporated into the same monitor.*

• The **Flushmount** bracket option allows the monitor to be mounted flush in an electrical panel or enclosure.

• **Above 990 Ton Press** requires a special ROM program which eliminates the decimal point. This special program should be requested when ordering it new.

IX. Troubleshooting the QUIK-LEARN

Problem   **Always shows - - - - on displays.**

Solution   The unit is looking for a zero value.

- Put unit in Calibration mode and see which channel is out of balance.

- Adjust the balance pot until it shows zero.

- If it is unable to balance, it could be a bad sensor. Unplug the sensor and attempt to balance.

- If sensor proves faulty, try to plug it into the other channel and see if the results are the same.

- Replace sensor if it is faulty.

- Don't allow lubrication and water to enter the sensor. Moisture in the sensor will result in corrosion. This corrosion responds like a resistor across the gauge and prevents the unit from balancing. The result is a readout of zero tonnage.

Problem   **Shows two readings from every stroke.**

Solution   Either a limit switch is double triggering the unit, the threshold value is set too low, or a double-hit is occurring.

- If the threshold is set to zero, this indicates that you are using a cam switch to trigger the unit. Check the cam switch.

- If the threshold is set above the zero value, adjust it one notch higher and see if that eliminates the double readings.

- If you suspect the tonnage rises and falls past the threshold more than once during the stroke (you can confirm this by using the optional TTGraph software), using the delay time feature may help. See Step 4 on Page 15.

- You may have to connect the unit to a cam switch if this proves unsuccessful. See Figure 6, Cam Switch Wiring Connections, and Page 12, for details.

Problem   **Monitor does not update.**

Solution   The press is not generating enough tonnage to trigger the monitor to read.

- If threshold is set to zero, check cam switch for proper operation.

- If threshold is set above zero, lower the setting until monitor starts updating.

X. Definition of Terms

Alarm   A reading that is out of the high or low limit range causing the relay to de-energize. Once alarmed, the relay opens to stop the press/machine.

Balance   The balance adjustment equalizes the sensor to the monitor. The balance pot is used to bring the display to zero.

Benchmark   The tonnage of a good part made during the last cycle in "SETUP PEAK" mode.

Calibration Number   A reference value dialed in during the calibration process. When the calibration number is correct, the gain/span settings are correct.

Calibration   The process in which the Tonnage Monitor mounted on the machine is adjusted to read the same tonnage as the reference load cells in the bed of the press.

Cam Input   A switching input to the unit allowing tonnage to be read at a certain position in the stroke. It is usually obtained from a rotary cam wheel or a programmable limit switch.

Compression   The force generated by the sensor or load cell by compressing. It is usually found in the rear of a C-Frame press or on a Pitman arm.

Gain / Span   Gain, also called Span, is the amplification used by the monitor. A small amount of elongation of the sensor needs a large amount of gain to show a high reading. The gain is adjusted during calibration.

Reverse Load   The "snap through" or damaging negative forces occurring in the machine. Typically, the snap through rating is 10% of the capacity of the press.

Shut Height   The distance from the top of the bed of the press to the bottom of the ram when on BDC. Most OBI/OBS presses have a shut height of approximately fifteen inches and a ram adjust of approximately four inches.

Signature   A waveform generated by the compression or tension of the press as the part is being made; seen at the analog output, or downloaded by software from the computer output.

Appendix A

SENSORS PLACEMENT & INSTALLATION

NOTES:

1) (2) SENSORS REQUIRED
2) (2) SENSOR ENCLOSURES ARE
   INCLUDED. THESE HELP PROTECT
   THE T400 SENSOR GAUGES.
   THESE ENCLOSURES INCLUDE 1/2"
   KNOCK-OUT HOLES. IF CONDUIT IS
   USED, WE SUGGEST USING 1/2" STRAIN
   RELIEFS IN THE KNOCK-OUT HOLES.

SENSOR PLACEMENT

Sensor location must be determined.
You have two locations. The front
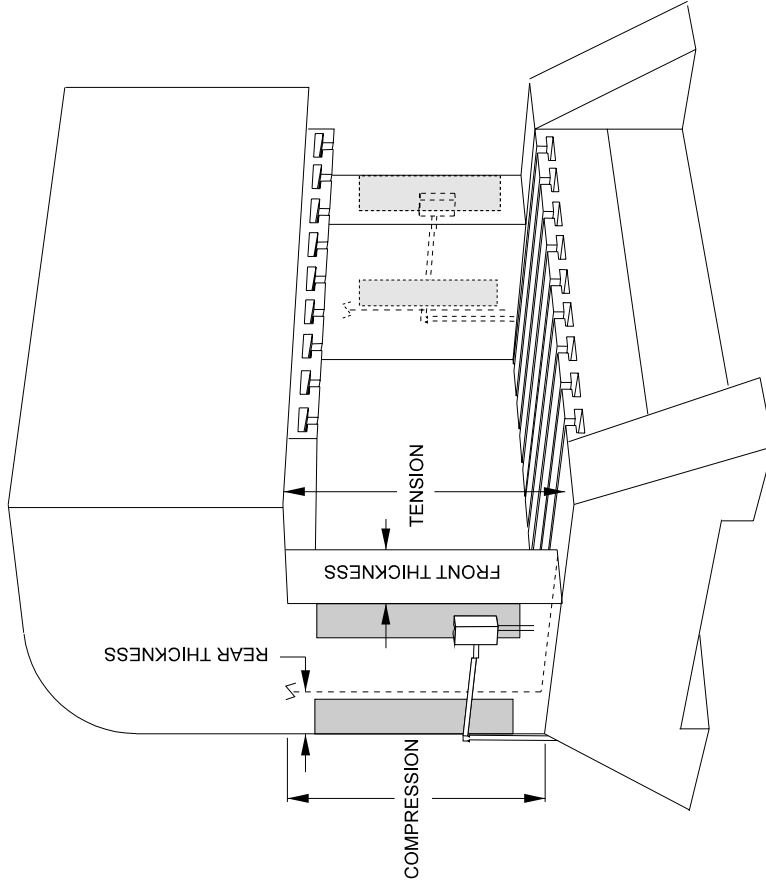or the rear of the press. (Shown in
the shaded area.)

HOW TO DETERMINE THE BEST LOCATION
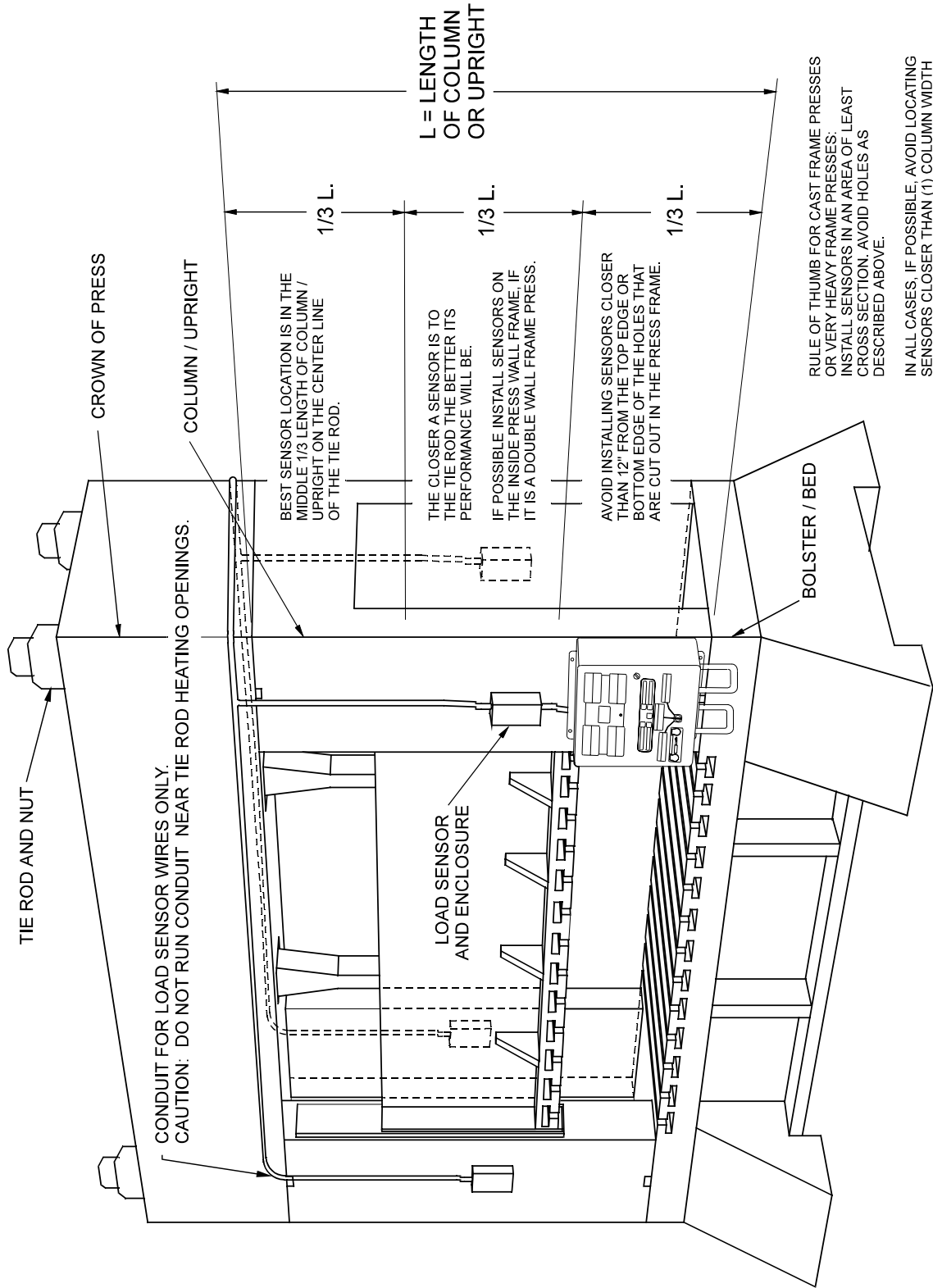
* MEASURE THE REAR THICKNESS

_____ REAR

* MULTIPLY BY THREE   X 3   =   [   ]
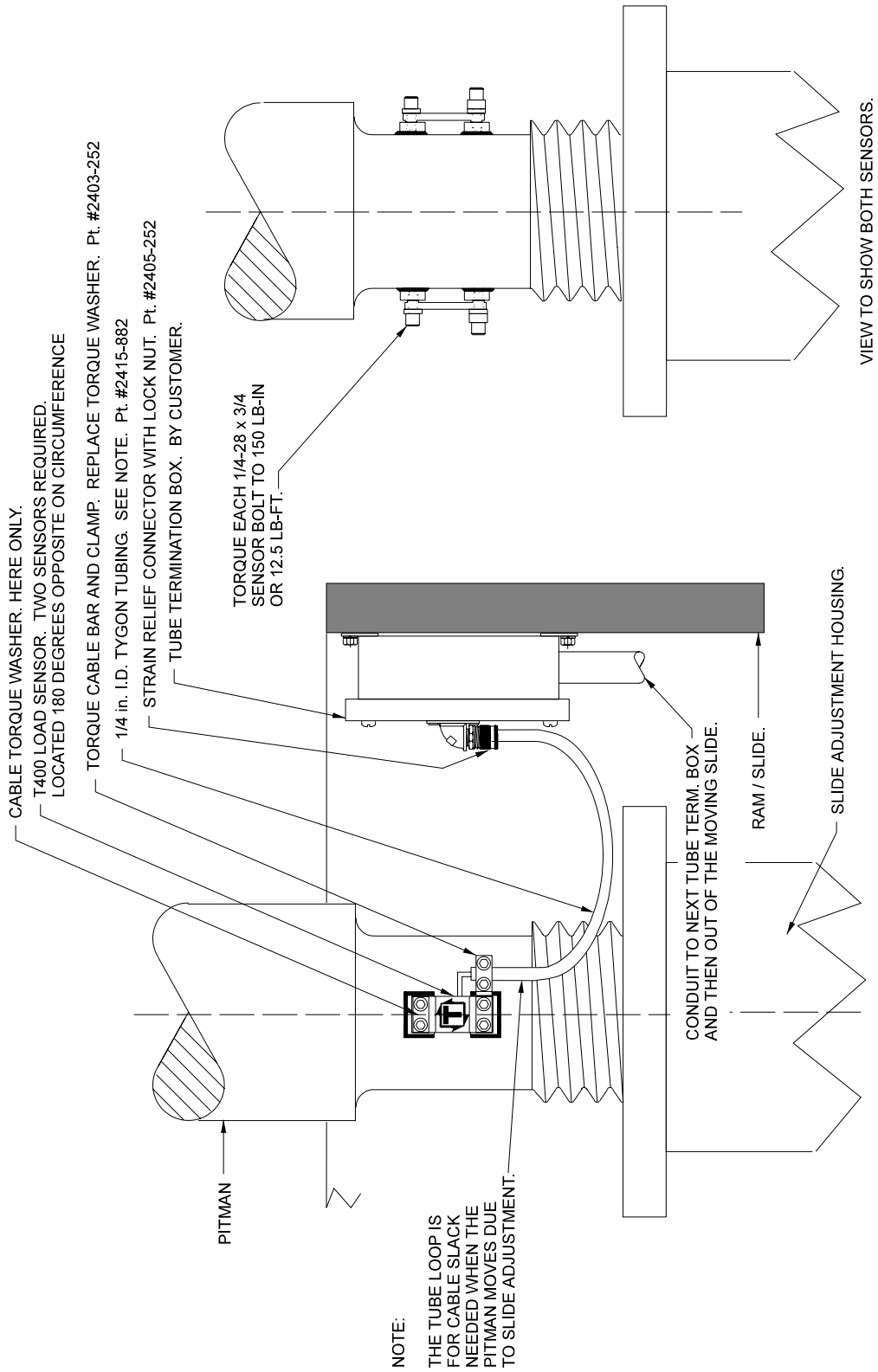
* MEASURE THE FRONT THICKNESS

_____ FRONT

If the front thickness is smaller

than value in [   ], then mount

sensors in the front. (This is the most common.)
If the front thickness is larger, then place the sensor
in the rear. Adjust the input connection for
compression readings instead of tension.

L = LENGTH OF COLUMN OR UPRIGHT

1/3 L.

1/3 L.

1/3 L.

CROWN OF PRESS

COLUMN / UPRIGHT

BEST SENSOR LOCATION IS IN THE MIDDLE 1/3 LENGTH OF COLUMN / UPRIGHT ON THE CENTER LINE OF THE TIE ROD.

THE CLOSER A SENSOR IS TO THE TIE ROD THE BETTER ITS PERFORMANCE WILL BE.

IF POSSIBLE INSTALL SENSORS ON THE INSIDE PRESS WALL FRAME, IF IT IS A DOUBLE WALL FRAME PRESS.

AVOID INSTALLING SENSORS CLOSER THAN 12" FROM THE TOP EDGE OR BOTTOM EDGE OF THE HOLES THAT ARE CUT OUT IN THE PRESS FRAME.

RULE OF THUMB FOR CAST FRAME PRESSES OR VERY HEAVY FRAME PRESSES: INSTALL SENSORS IN AN AREA OF LEAST CROSS SECTION. AVOID HOLES AS DESCRIBED ABOVE.

IN ALL CASES, IF POSSIBLE, AVOID LOCATING SENSORS CLOSER THAN (1) COLUMN WIDTH FROM THE CROWN OR BOLSTER.

BOLSTER / BED

TIE ROD AND NUT

CONDUIT FOR LOAD SENSOR WIRES ONLY. CAUTION: DO NOT RUN CONDUIT NEAR TIE ROD HEATING OPENINGS.

LOAD SENSOR AND ENCLOSURE

CABLE TORQUE WASHER. HERE ONLY.

T400 LOAD SENSOR. TWO SENSORS REQUIRED.
LOCATED 180 DEGREES OPPOSITE ON CIRCUMFERENCE

TORQUE CABLE BAR AND CLAMP. REPLACE TORQUE WASHER. Pt. #2403-252

1/4 in. I.D. TYGON TUBING. SEE NOTE. Pt. #2415-882

STRAIN RELIEF CONNECTOR WITH LOCK NUT. Pt. #2405-252

TUBE TERMINATION BOX. BY CUSTOMER.

TORQUE EACH 1/4-28 x 3/4
SENSOR BOLT TO 150 LB-IN
OR 12.5 LB-FT.

VIEW TO SHOW BOTH SENSORS.

CONDUIT TO NEXT TUBE TERM. BOX
AND THEN OUT OF THE MOVING SLIDE.

RAM / SLIDE.

SLIDE ADJUSTMENT HOUSING.

PITMAN

NOTE:

THE TUBE LOOP IS
FOR CABLE SLACK
NEEDED WHEN THE
PITMAN MOVES DUE
TO SLIDE ADJUSTMENT.

USING THE T400 SENSOR
INSTALLATION FIXTURE KIT No. 1977-749

(METRIC INSTALLATION FIXTURE KIT No. 1974-749)

DRILL AND TAP METHOD FOR MOUNTING SENSORS

BE SURE THE SENSOR LOCATION FOLLOWS THE
BEST LOCATION DESCRIBED ON THE PREVIOUS
PAGES.
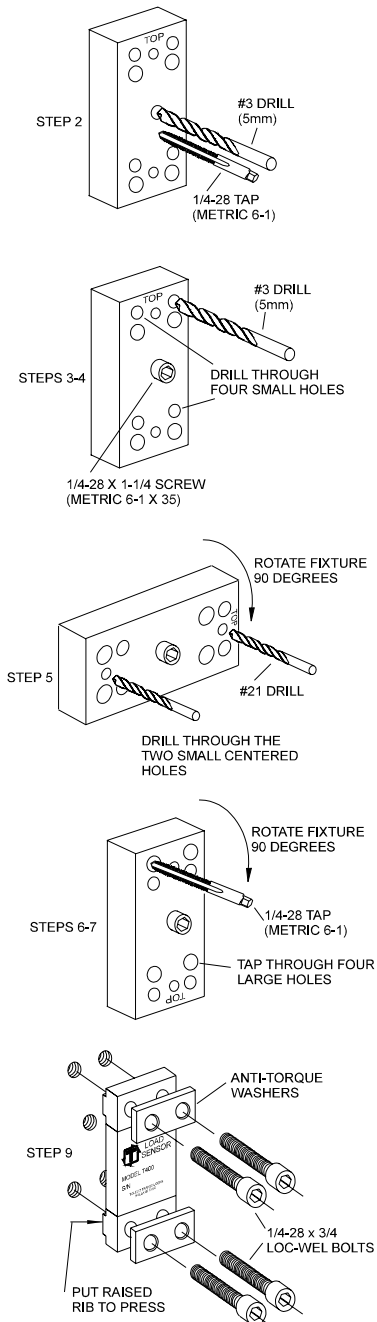
STEP 1 Remove all paint and grease from sensor mount area. If the machine surface is flat (total indicated reading of .002") and smooth (125 μ in.) the load sensor can be bolted directly to the surface.

STEP 2 Drill and tap the center hole for mounting the fixture to the press member. This hole should be ½ inch (13mm) deep.

STEP 3 Bolt the fixture to the press member using the ¼-28 by 1-¼ inch (M6-1 x 35) long socket head cap screw in the center of the fixture.

STEP 4 Insert the number 3 drill (5mm) into the smaller corner hole and drill out all four holes to a depth of ¾ of an inch (19mm.)

STEP 5 Loosen the fixture. Rotate the fixture 90 degrees clockwise. Tighten the center screw of the fixture. Insert the number 21 drill into the small centered hole and drill out both holes to a depth of 3/8 of an inch. These holes are for mounting the sensor enclosure. The fixture does not allow for tapping these holes. They are tapped without the fixture. Enclosure mounting is not done in metric.

STEP 6 Loosen the fixture. Rotate the fixture another 90 degrees clockwise such that the larger corner holes line up with the holes drilled in Step 4. Insert a tap to be sure the holes line up. Lock the fixture in place by tightening the center screw.

STEP 7 Insert the tap into the larger tap guide holes and tap each hole. BE SURE TO USE PLENTY OF TAPPING FLUID.

STEP 8 Remove the fixture and repeat Steps 1-7 for each additional sensor mounting position.

STEP 9 Mount the sensor with the raised rib to the press. The anti-torque washers should go between the screw and the sensor body. Torque each ¼-28 x ¾ in. long socket head cap screw to 150 LB.-IN or 12.5 LB.-FT.

Doc # : 4771   Rev :E   **Toledo Transducers, Inc.**

USING THE T400 SENSOR
# INSTALLATION FIXTURE KIT No. 1977-749

WELD PAD METHOD FOR MOUNTING SENSORS

BE SURE THE SENSOR LOCATION FOLLOWS
THE BEST LOCATION DESCRIBED ON THE
PREVIOUS PAGES.
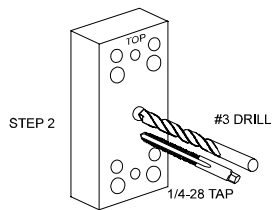
STEP 1   Remove all paint, grease, and or rust from surface to be welded.
(Surface should be flat T.I.R. 1/32 of an inch.)

STEP 2   Drill and tap the center hole for mounting the fixture to the
press member. This hole should be ½ inch deep. (Optional)
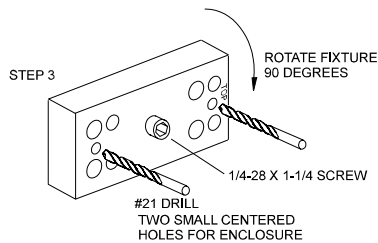
STEP 3   Bolt the fixture to the press member using the ¼-28 by 1-¼ inch
long socket head cap screw in the center of the fixture. Orient
the fixture as shown and drill out the #21 holes to a depth of 3/8
of an inch for the enclosure mounting. The fixture is not
used for tapping these holes. (Optional)
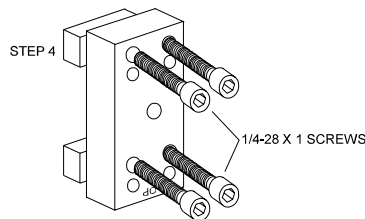
STEP 4   Remove the fixture from the press member. Bolt the weld pads
to the fixture with ¼-28 by 1 inch long socket head cap screws
provided. Reattach the fixture with the weld pads bolted on
using the center hole as in Step 3. Orient the fixture as shown.
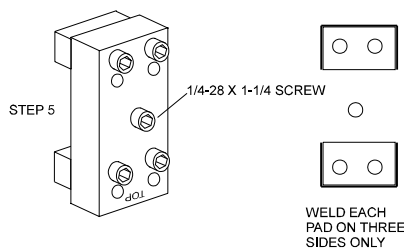
STEP 5   Weld the weld pads to the press member. (BE SURE TO
ONLY WELD THE WELD PADS ON THREE SIDES AS
SHOWN.) A single pass is sufficient. Do not remove the
fixture until slag is removed and or assembly has cooled. When
welding cast iron, use a dry nickel rod such as: Lincoln Electric
"Soft Weld", Hobart "NI Cast 99", or MB Weld Prod. "MG
210. Strike arc on steel then puddle into the cast iron.
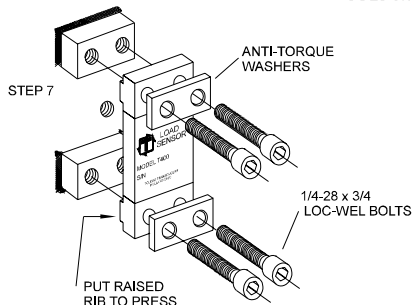
STEP 6   Remove the weld fixture. <u>DO NOT WELD AFTER FIXTURE
IS REMOVED.</u> The 4 screws holding the pads to the fixture
and the 1 center screw may be discarded. <u>DO NOT USE THE
FOUR 1 INCH LONG SCREWS TO ASSEMBLE SENSOR.</u>
The sensor kit contains four ¾ inch long screws for assembling
the sensor to the press member. Weld pad surface must be clean
– no weld bumps, scratches, etc. Be sure the weld pad tapped
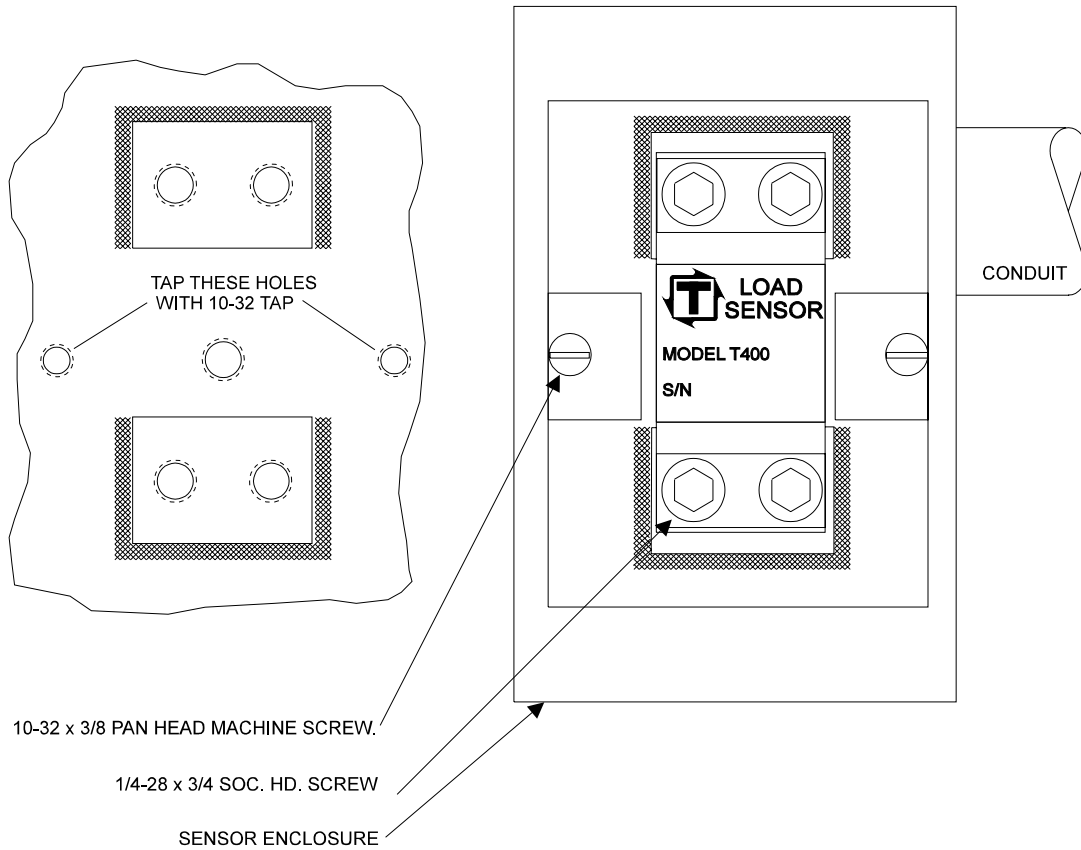holes are clean and bottom of holes are free of weld flash.

STEP 7   Mount the sensor with the raised rib to the press. The anti-
torque washers should go between the screw and the sensor
body. Torque each ¼-28 x ¾ in. long socket head screw to 150
LB.-IN or 12.5 LB.-FT.

Doc # : 4771   Rev :E   **Toledo Transducers, Inc.**

SENSOR ENCLOSURE MOUNTING

USE 10-32 TAP IN THE TWO 3/8 DEEP
HOLES THAT WERE DRILLED WITH THE
FIXTURE IN THE PREVIOUS INSTRUCTIONS.
MOUNT THE ENCLOSURE TO THE PRESS
MEMBER AND RUN 1/2 INCH CONDUIT
TO THE LOAD MONITOR ENCLOSURE.

RUN SENSOR CABLE THROUGH CONDUIT. PLACE
SENSOR ON MOUNTING HOLES. PLACE ANTI-
TORQUE WASHERS OVER SENSOR HOLES.
SCREW IN SENSORS BOLTS, (4) EACH, FINGER
TIGHT. USE ONLY THE 1/4-28 x 3/4 "LOC-WEL"
BOLTS THAT ARE IN THE SENSOR PACKAGE.
TORQUE EACH 1/4-28 x 3/4 SCREW TO 150 LB.-IN.
OR 12.5LB.-FT. ASSEMBLE BOX COVER.

TAP THESE HOLES
WITH 10-32 TAP

CONDUIT

LOAD
SENSOR

MODEL T400

S/N

10-32 x 3/8 PAN HEAD MACHINE SCREW.

1/4-28 x 3/4 SOC. HD. SCREW

SENSOR ENCLOSURE

Appendix B

SENSOR CABLE CONNECTION

Connecting Sensor cable to the QUIKLEARN

Sensor Connection Guidelines
1). Strip the sensor cable as shown in Figure A.
   Be sure not to nick any of the signal conductors or strip the shield completely away. At least
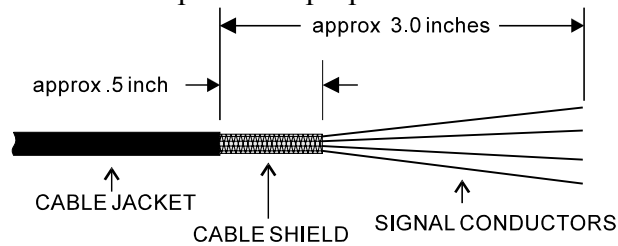   ½ inch of cable shield should be exposed for proper insertion in to the wire lug.

approx 3.0 inches

approx .5 inch

CABLE JACKET
CABLE SHIELD
SIGNAL CONDUCTORS

Figure A

2). Insert the cable through the lug as shown in Figure B.
   Make sure the cable shield is aligned with the portion of the wire lug which will be crimped.

3). Next, crimp the lug on to the cable shield, **do not crimp too tight and risk smashing the
   wires**. This could cause them to short to ground. Figure C shows a side view of the
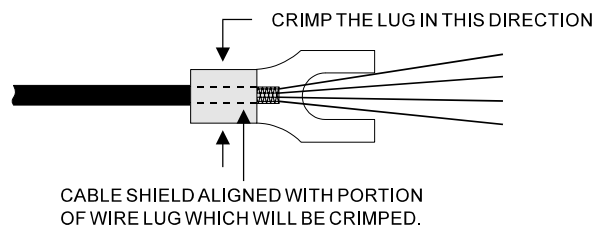   completed operation after crimping.

CRIMP THE LUG IN THIS DIRECTION

CABLE SHIELD ALIGNED WITH PORTION
OF WIRE LUG WHICH WILL BE CRIMPED.

Figure B

Figure C

4). Attach the wire lug to a ground terminal on the back of the QuikLearn. Use a 6-32 x ¼"
      screw for the grounding lug connection. If you have a Toledo Transducers sensor, attach
      the signal wires to the proper channel phoenix connector following the color code shown
      in figure D and on the back of the QuikLearn enclosure.

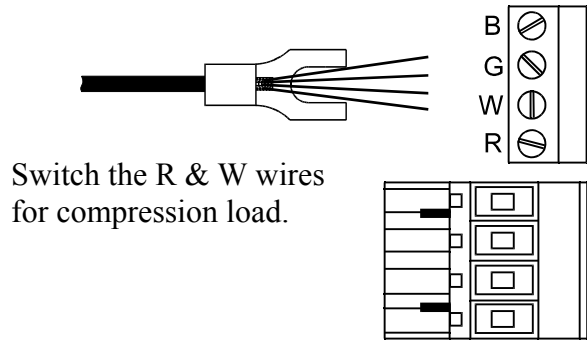Switch the R & W wires
for compression load.

Figure D

Note: If your sensor cable is not double shielded with both foil and a braid, electrical noise may
    affect your output readings.