ZT-SLIM

Tonnage Load Monitor

By Toledo Integrated Systems

User’s Manual

ZT-SLIM
User's Manual

2-14-2019

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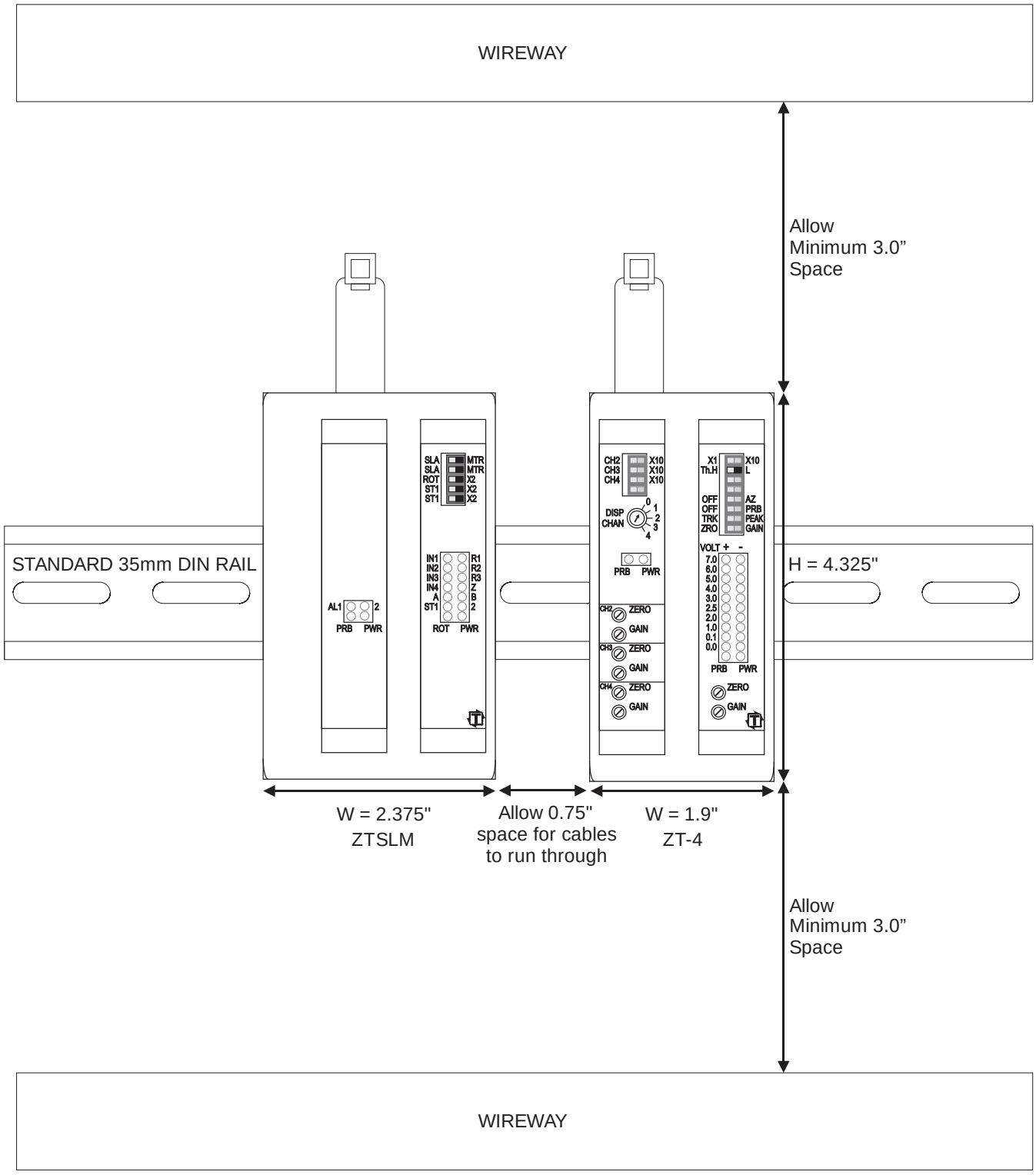
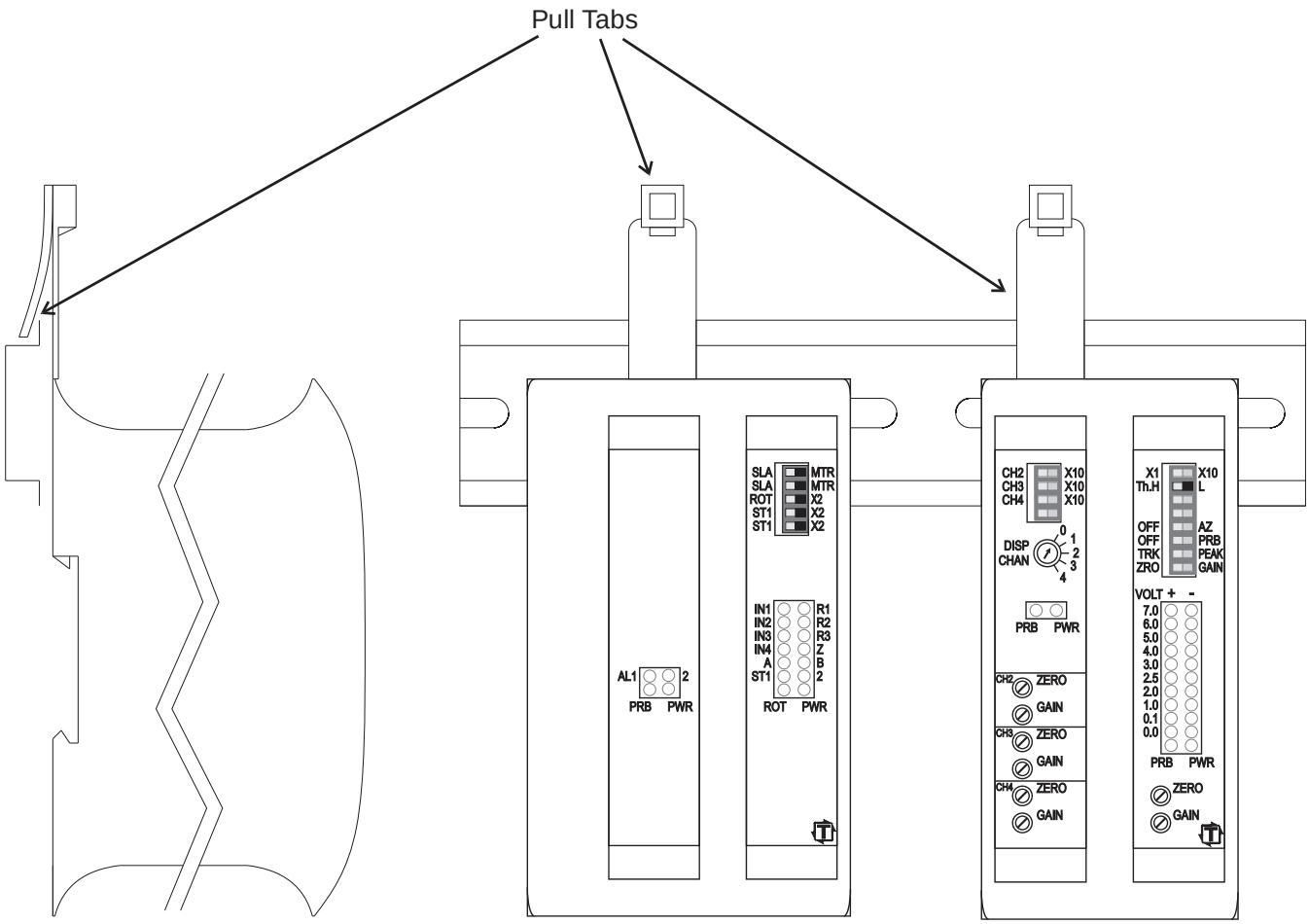
1) Mounting the ZT-SLIM UNITS

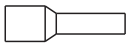


2) Working with the ZT-SLIM Units

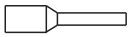


The ZT-SLIM are compact units with a lot of connections on the top and bottom. Use the Pull Tabs to hang the units on the Din Rail as shown while you move the units around to make connections or measurements.

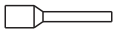
3) Wire Termination



14AWG Yellow



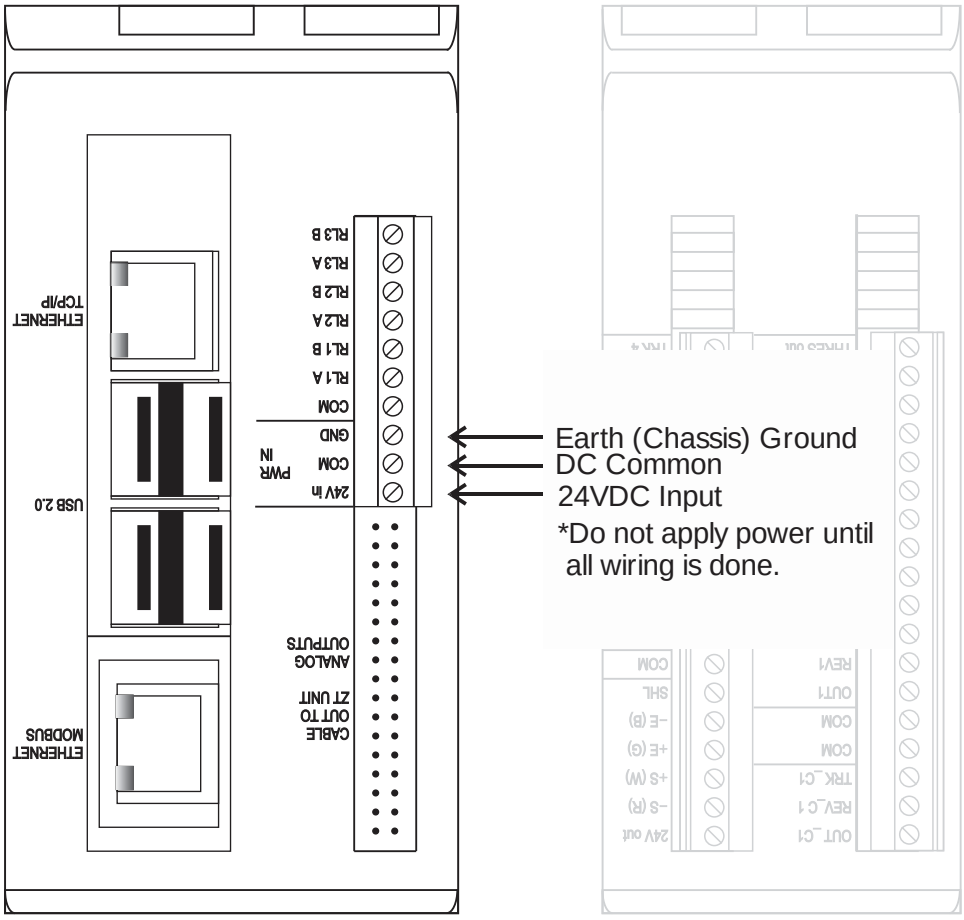
22AWG White



26AWG Grey

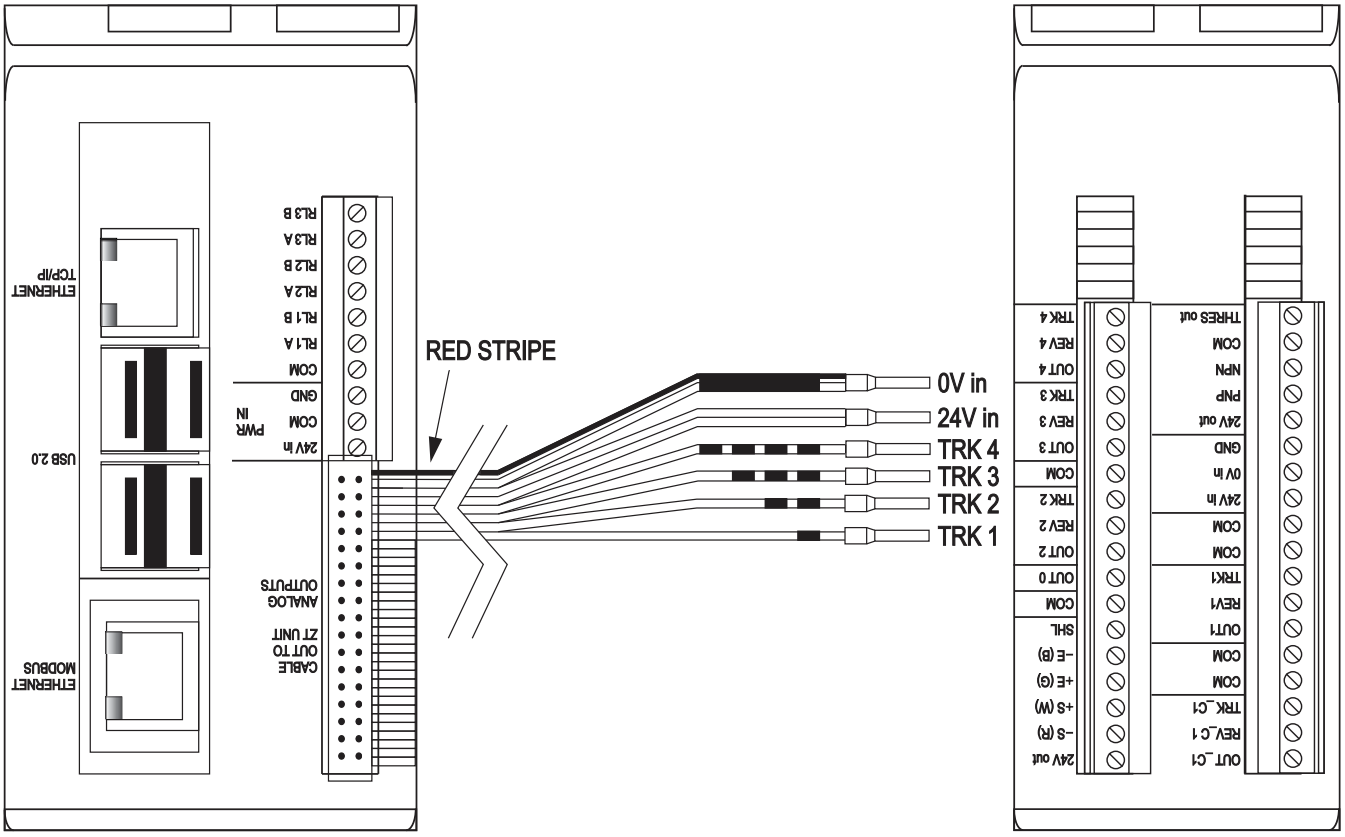
The ZT-SLIM package comes with wire ferrules of different sizes. Use them to terminate all wires. They provide strain relief which make the wires connect better.

4) DC Power Connection



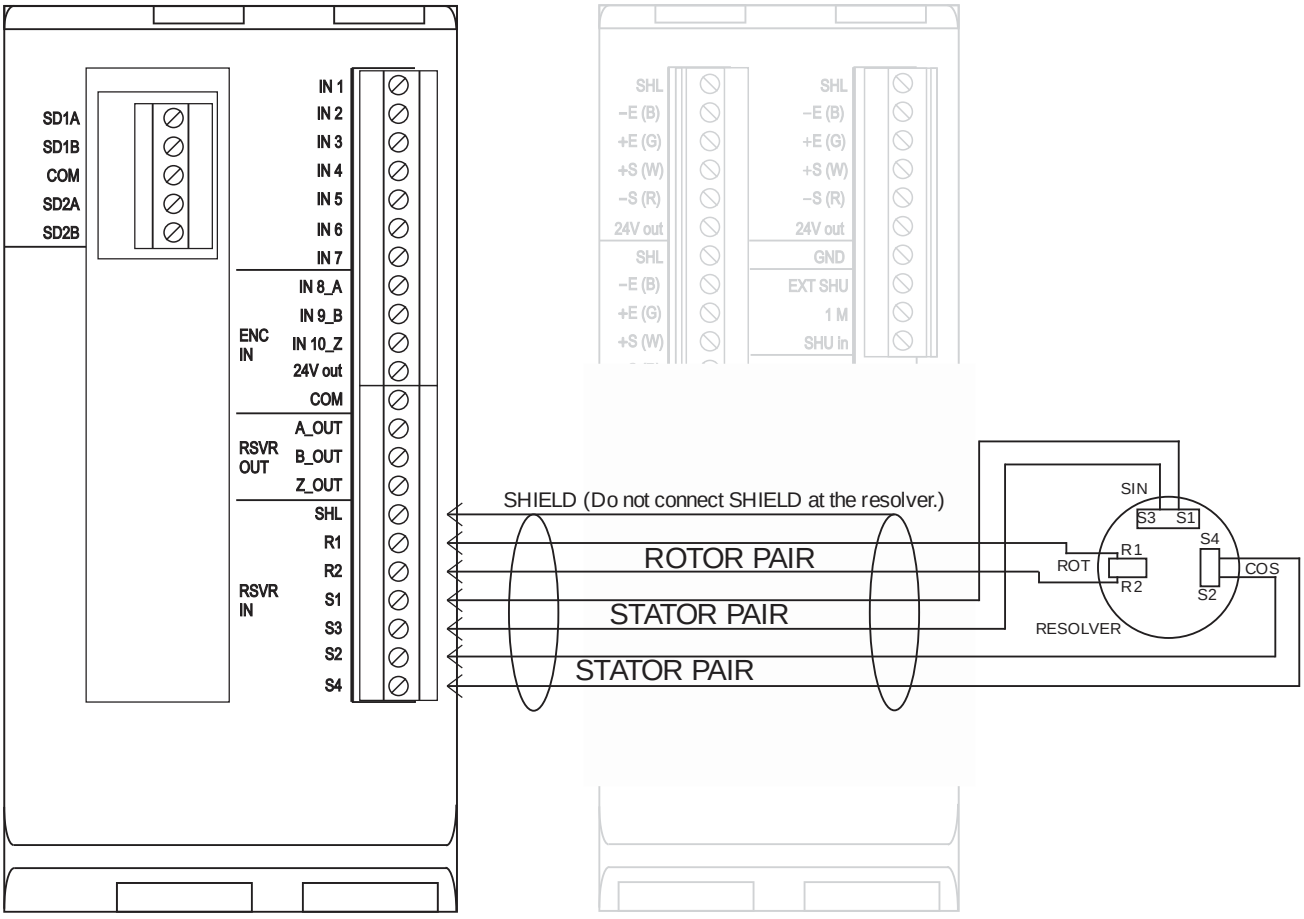
ZTSLM Bottom View ZT-4

5) ZTSLM To ZT-4 Connection



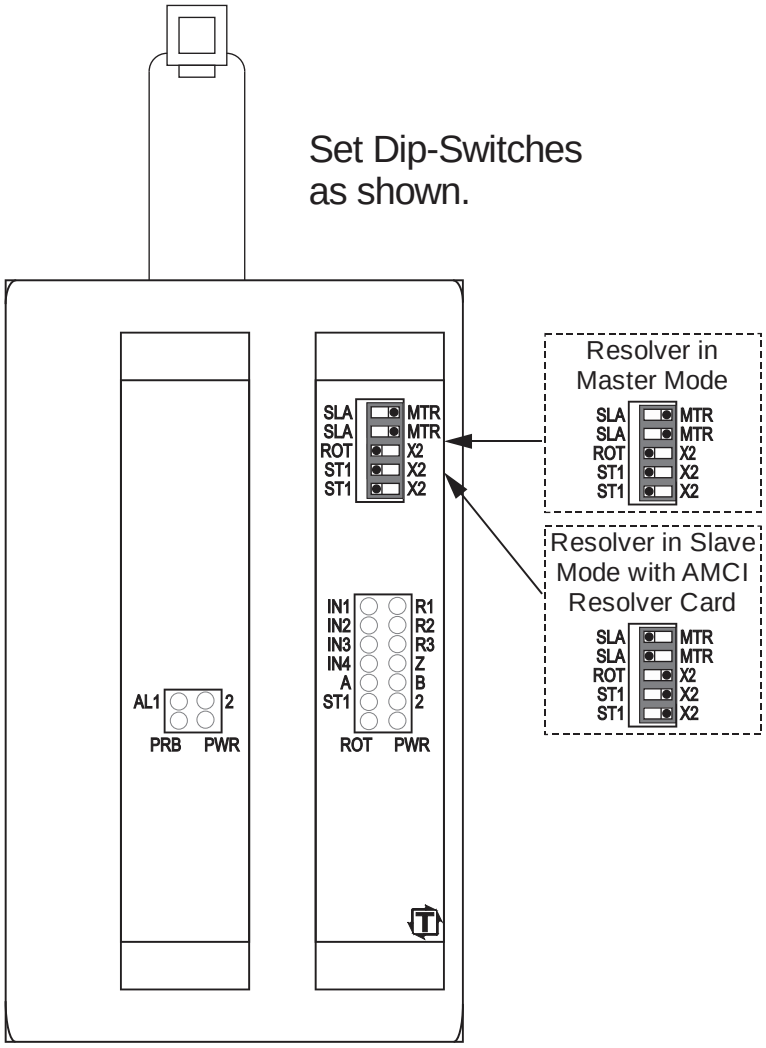
ZTSLM Bottom View ZT-4

6) Resolver Connection



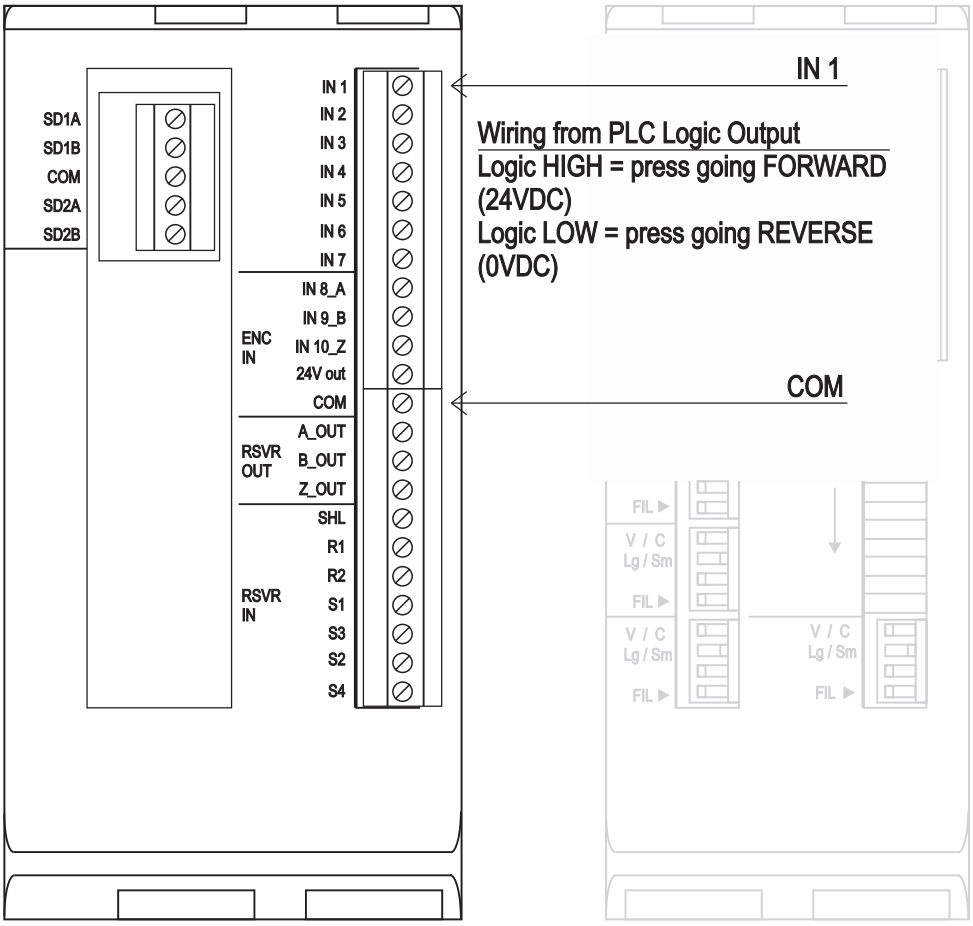
ZTSLM Top View ZT-4

7) Resolver Dip Switch Settings



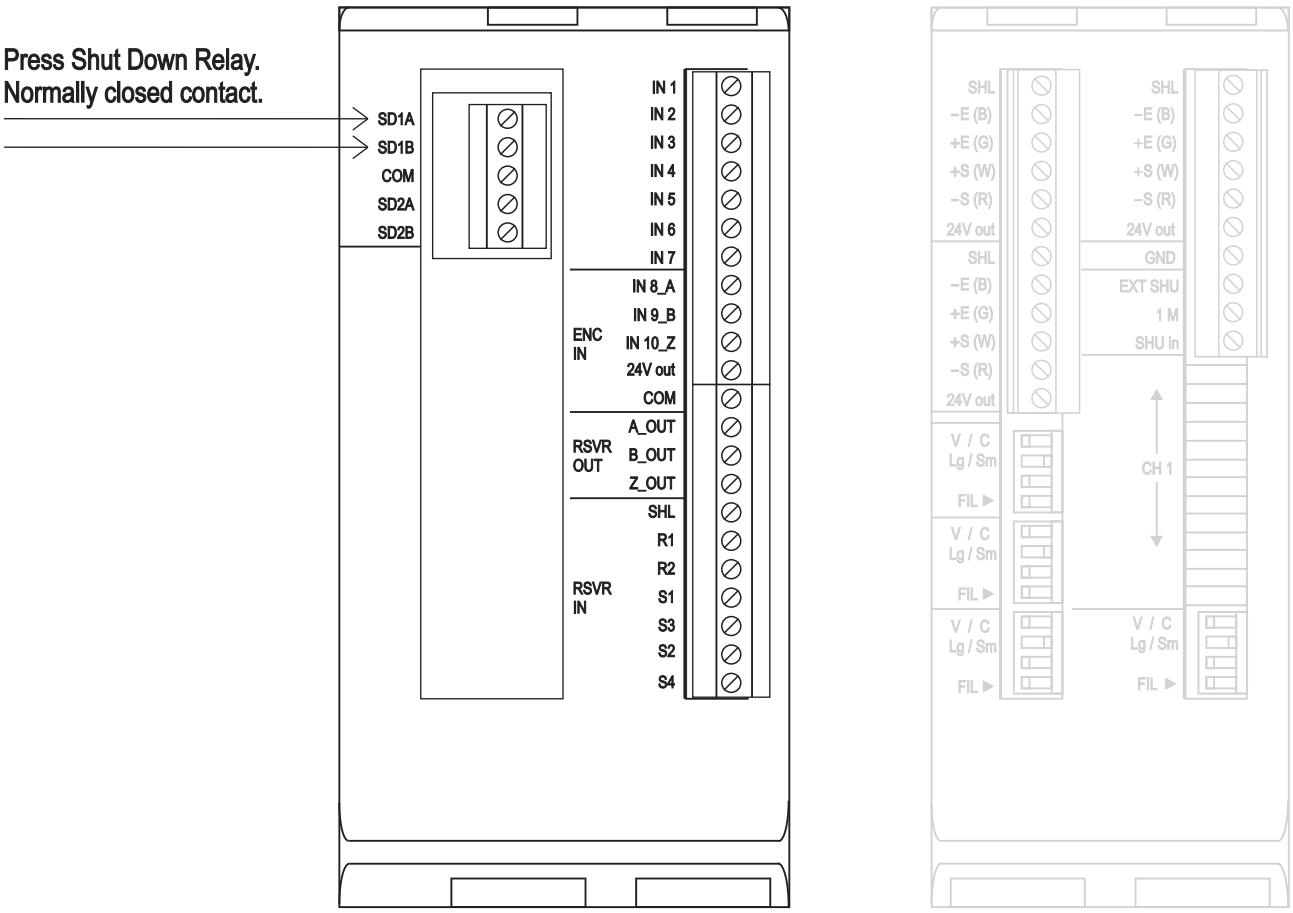
ZTSLM

8) Servo Press Direction Signal



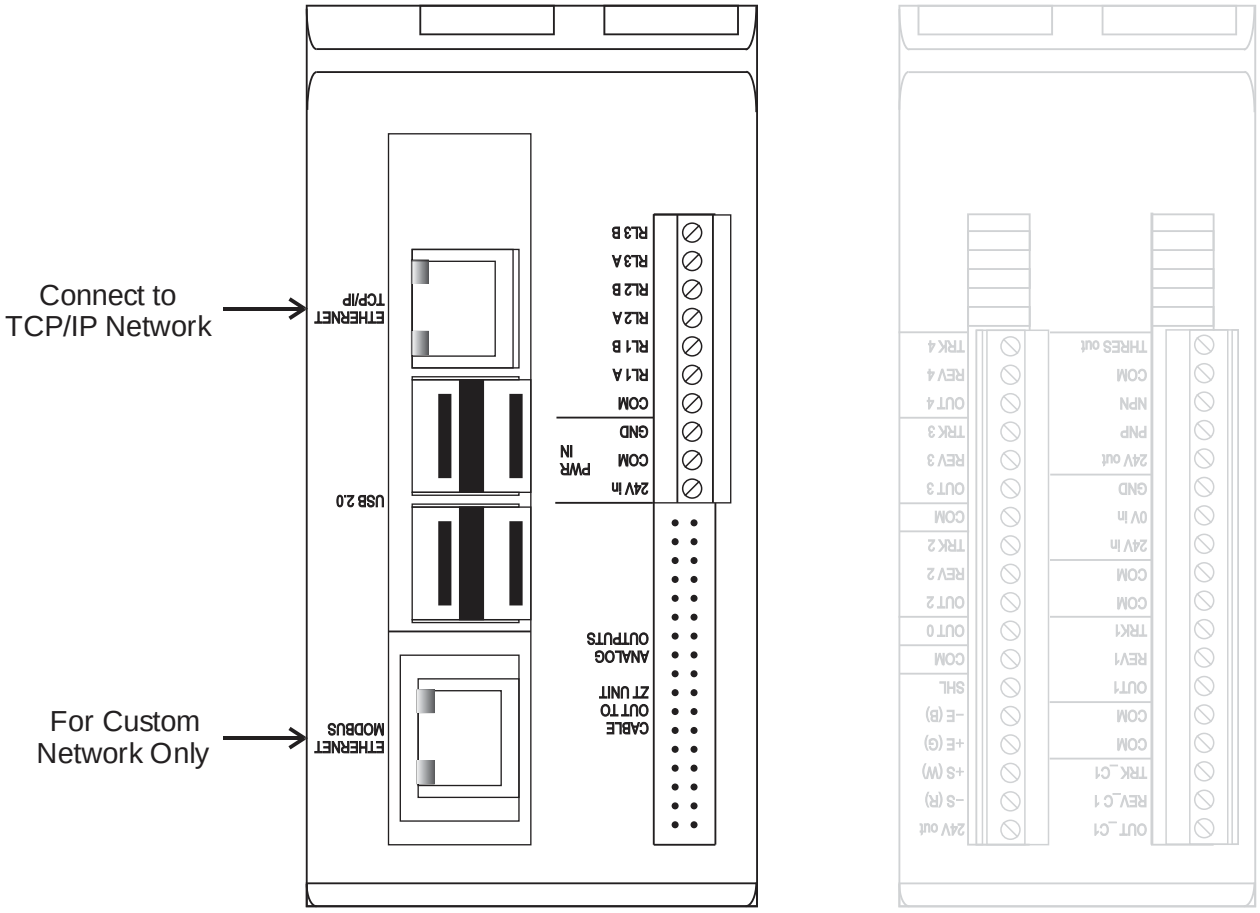
ZTSLM Top View ZT-4

9) Shutdown Relay Connection

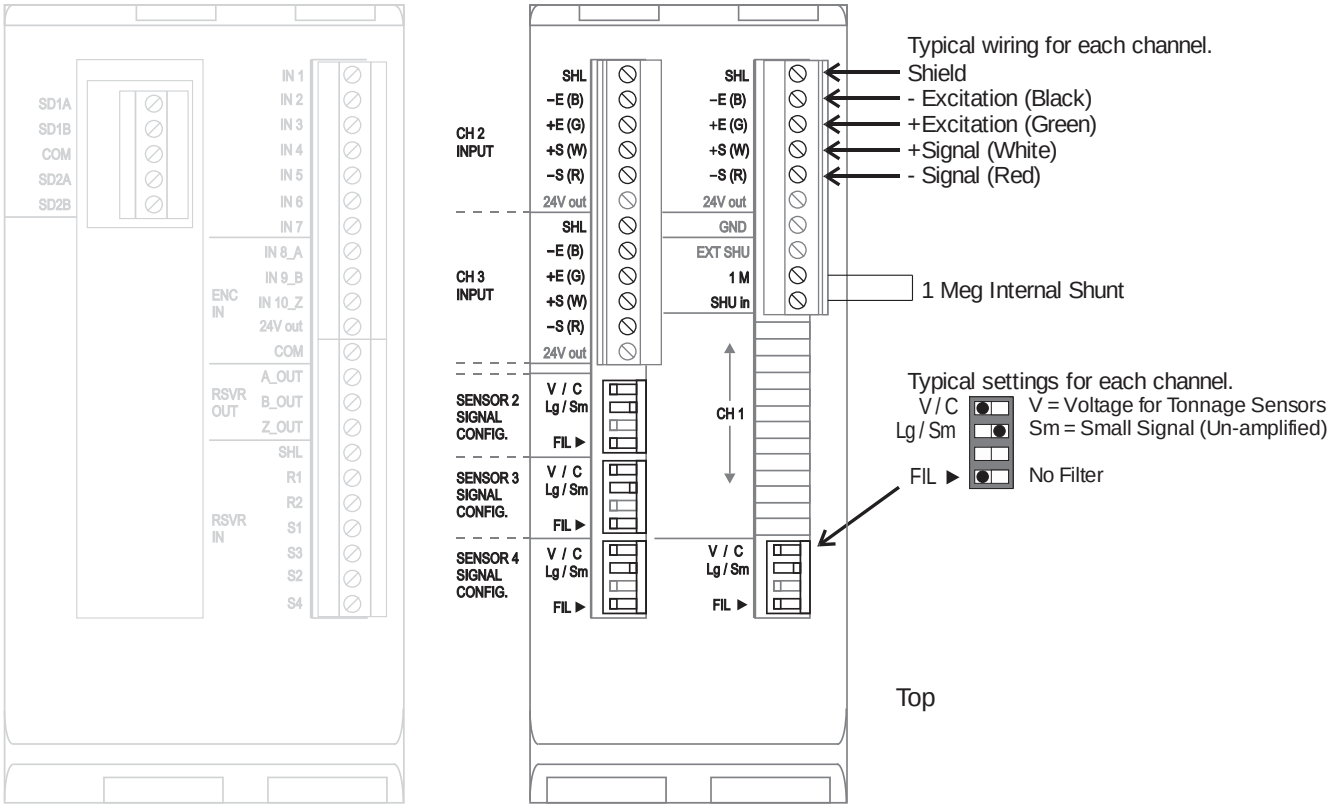


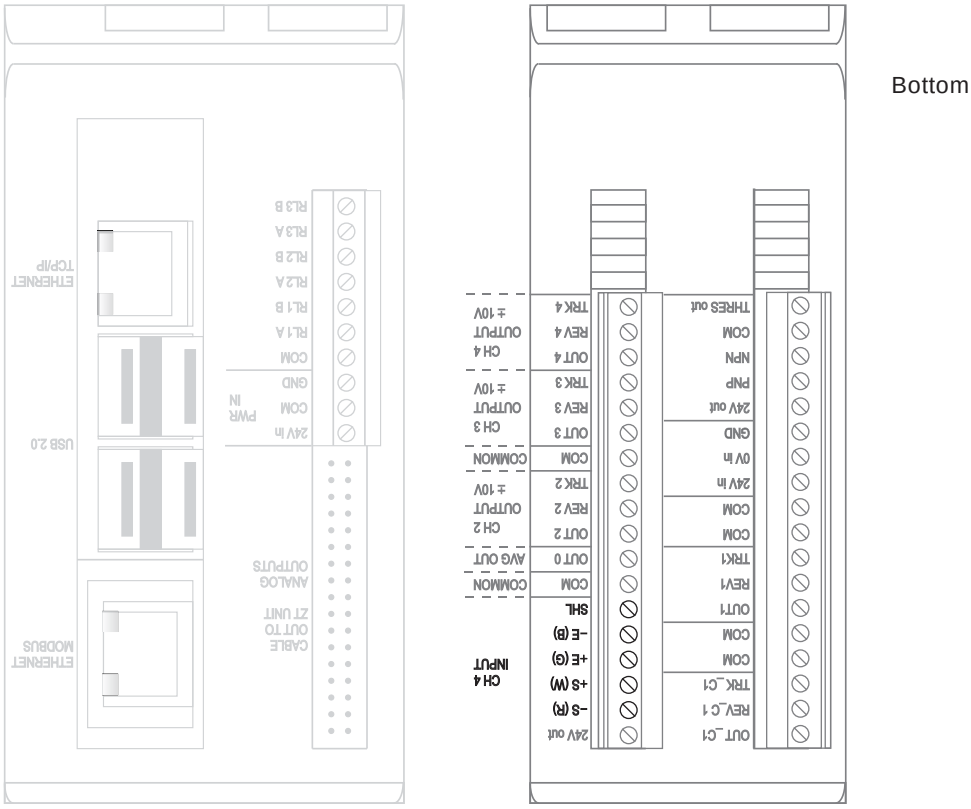
ZTSLM TOP VIEW ZT-4

10) Network Connection

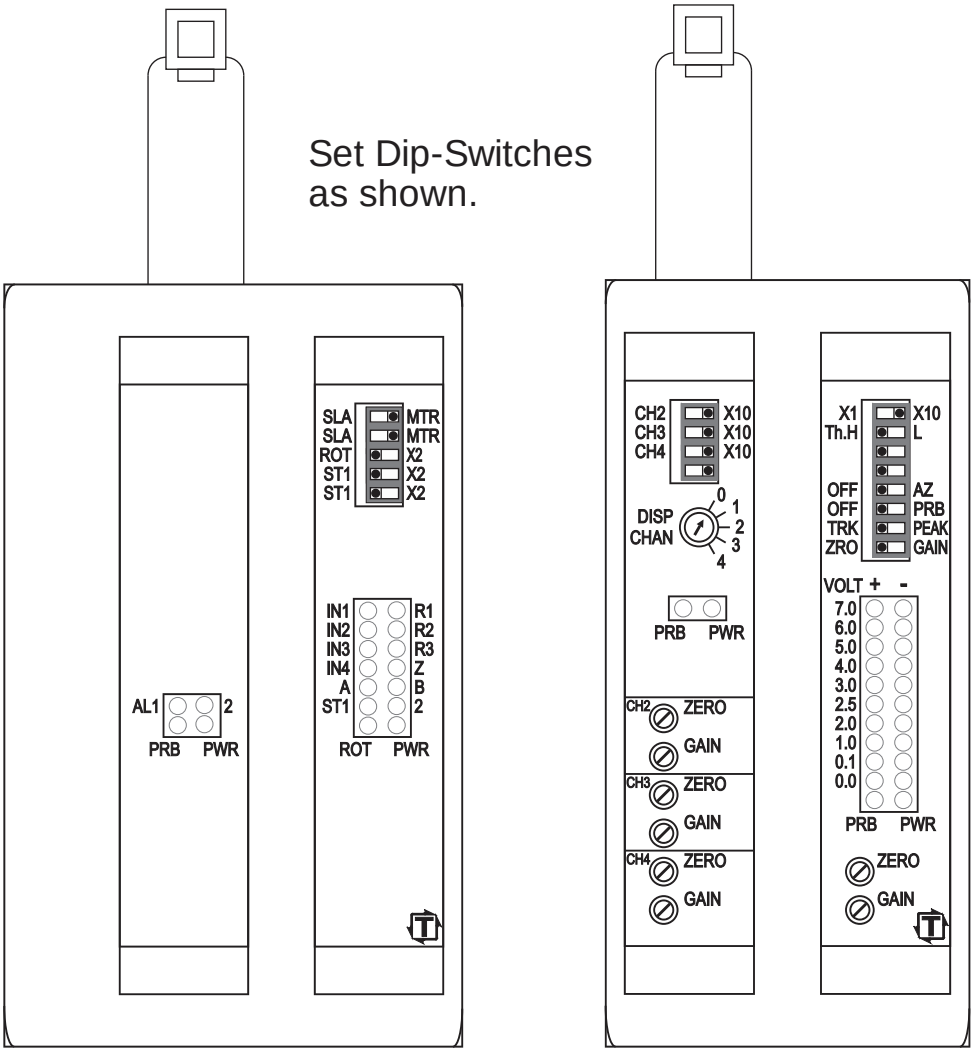


11) T400 Sensor Connections/Configurations





12) Typical Switch Settings



ZTSLM ZT-4

13) Calibration Procedures

1) Before calibrating the unit, verify each piece of hardware is connected and set up properly.

2) With the sensors placed in the best possible location, (see appendix), torque the sensors down to 150 in-lbs on the sensor bolts. Do not put the sensor enclosure covers on yet. You will need to test each sensor location.

3) Find the shut height of the press.

   - Jog the press until the ram is at bottom dead center (BDC) or 180º without the load cells or die in the press.

   - Determine the amount of spacers needed with your load cell. Cycle the press without load cells to insure correct height.

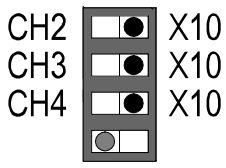
4) Place the load cells in the correct position in the press.

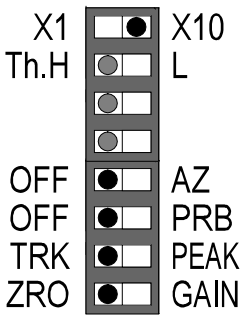
   - All load cells should be equal distance from the sides and front and rear. For example, 12" from the sides, 10" from front and rear. Load cells are typically placed at each corner of the press's bed.

   - Cycle the press without hitting the load cells first.

   - Place cardboard on the top and bottom of the load cells.

5) Set ZT-4 dip-switches as shown. set all gain pots to fully clockwise, then dial each gain pot about 12 turns counter-clockwise to start.





6) Balance the tonnage sensors.

   - Go to the Calibration page in SlimWare and select "Display Balance".
   - Adjust the ZERO pots until the Balance reads zero in each channel.

7) Cycle the press.

   - Select "Capture Tonnage" in SlimWare.
   - Further adjust the shut height so that the press impacts the load cells and generates a load at 100% of press capacity. See warning below.

> **WARNING**
> Depending on the press capacity and the size of the load cells being used, loading the press at capacity with load cells could indent the ram or bolster. If this is a concern, you may choose to calibrate the press only up to 80% of capacity.

8) Adjust the gain.

   - Run the press for 2 cycles at capacity.
   - Compare the tonnage readings in SlimWare with the load cell readings.
   - Adjust the GAIN pots.
   - Repeat until the SlimWare readings match the load cell readings.
   - If less gain is needed, change the Gain switch to X1.

Appendix

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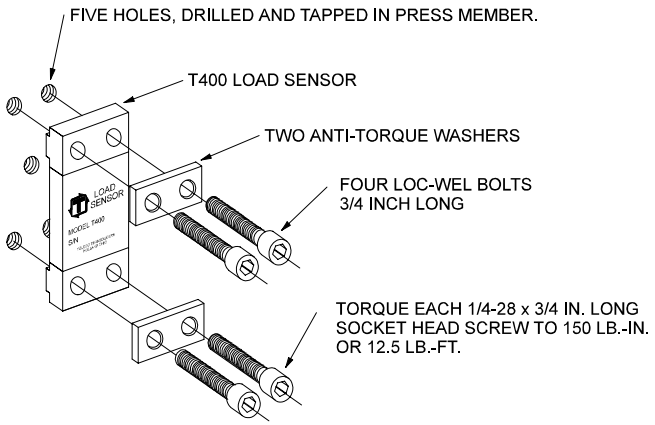
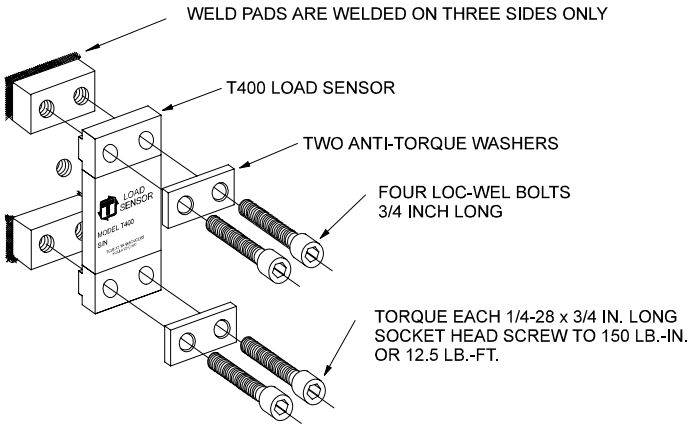
INSTALLING T400 LOAD SENSORS





The above illustrations represent the proper arrangement of Model T400 Load Sensor kit parts using either the Drill and Tap method or the Weld method.

A proper installation is necessary to produce good results.

Before installing the sensors, please read the appropriate instructions listed below.

Sensor Placement	Page 2
Press Frame	Page 3
Pitman Mount	Page 4
Drill and Tap Method of Installing Sensors	Page 5
Weld Method of Installing Sensors	Page 6
T400 Enclosure Mounting Details	Page 7

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

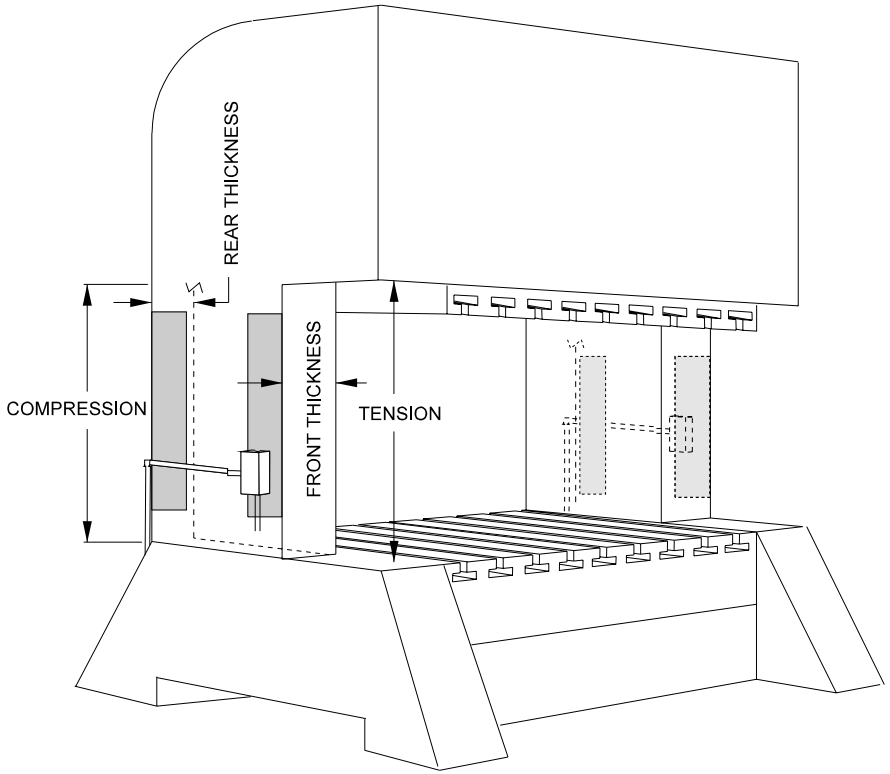
_____REAR

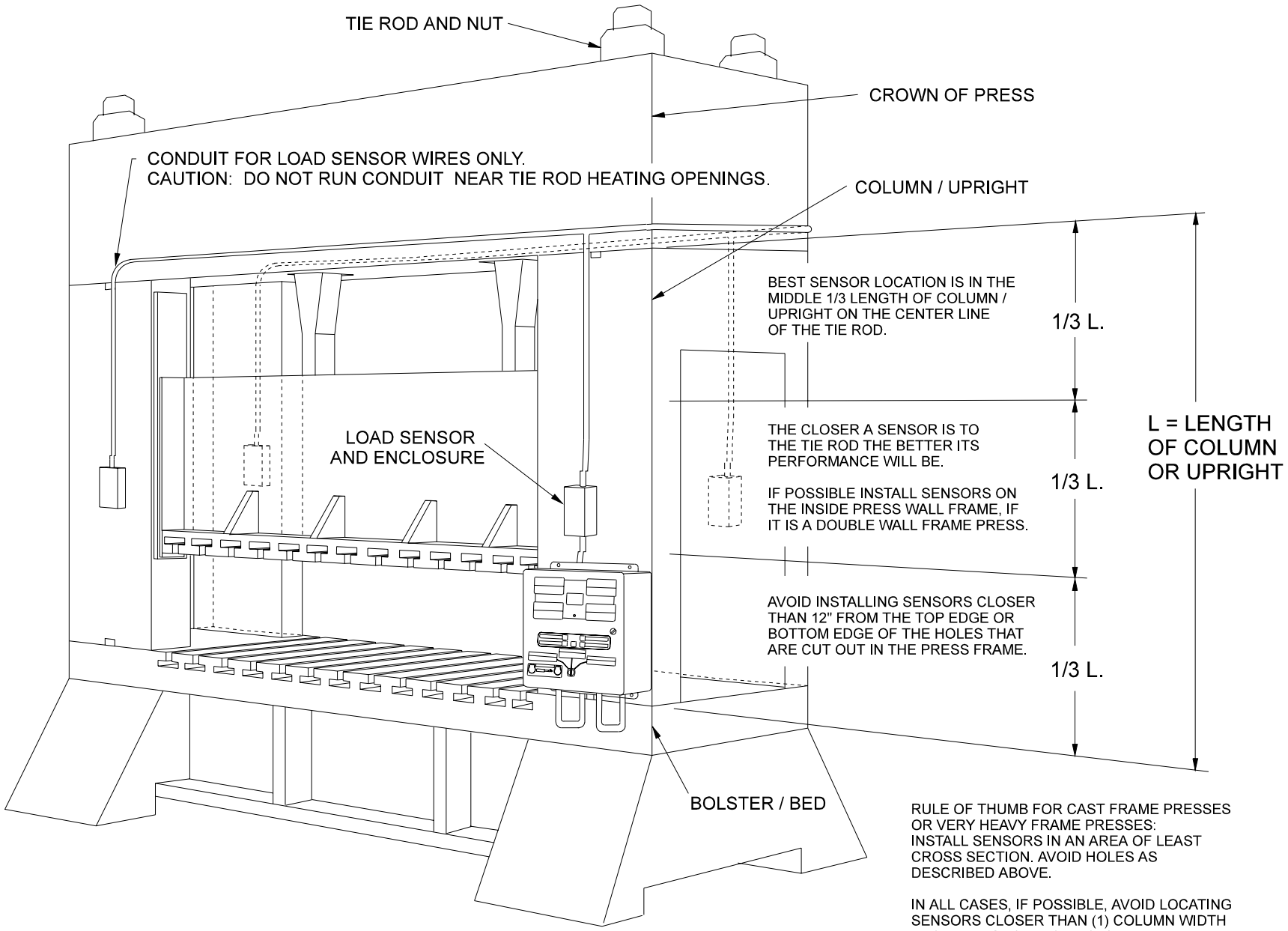
* MULTIPLY BY THREE X 3 = ☐

* MEASURE THE FRONT THICKNESS

_____FRONT

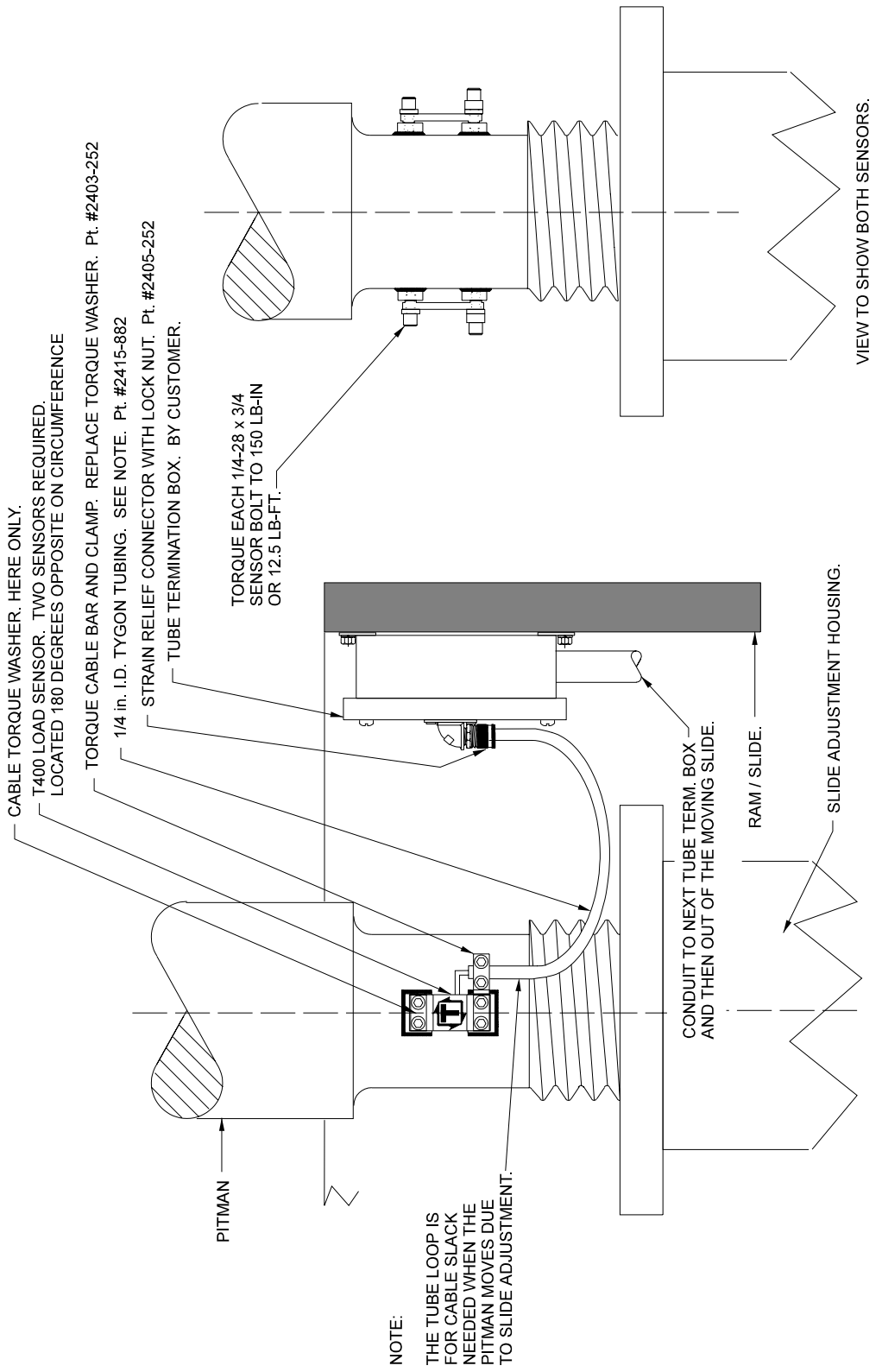
If the front thickness is smaller than value in ☐, then mount sensors in the front. (This is the most common.) If the front thickness is larger, then place the sensor in the rear. Adjust the input connection for compression readings instead of tension.





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.

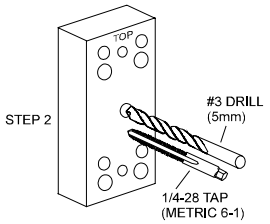

CABLE TORQUE WASHER. HERE ONLY.
T400 LOAD SENSOR. TWO SENSORS REQUIRED.
LOCATED 180 DEGREES OPPOSITE ON CIRCUMFERENCE
TORQUE CABLE BAR AND CLAMP. REPLACE TORQUE WASHER. Pt. #2403-252
1/4 in. I.D. TYGON TUBING. SEE NOTE. Pt. #2415-882
STRAIN RELIEF CONNECTOR WITH LOCK NUT. Pt. #2405-252
TUBE TERMINATION 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)

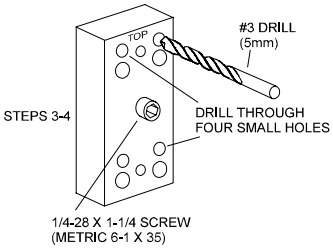
DRILL AND TAP METHOD FOR MOUNTING SENSORS

BE SURE THE SENSOR LOCATION FOLLOWS THE BEST LOCATION DESCRIBED ON THE PREVIOUS PAGES.



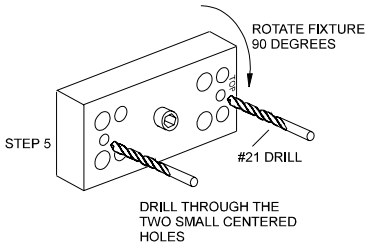
STEP 1 Remove all paint and grease from sensor mount area. If the machine surface is flat (total indicated reading of .002") and smooth (125 µ in.) the load sensor can be bolted directly to the surface.

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

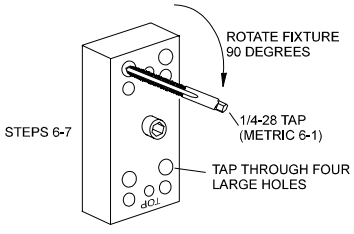


STEP 3 Bolt the fixture to the press member using the ¼-28 by 1-¼ inch (M6-1 x 35) long socket head cap screw in the center of the fixture.

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.)



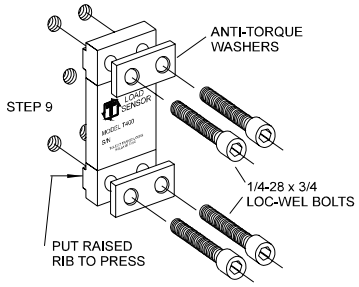
STEP 5 Loosen the fixture. Rotate the fixture 90 degrees clockwise. Tighten the center screw of the fixture. Insert the number 21 drill into the small centered hole and drill out both holes to a depth of 3/8 of an inch. These holes are for mounting the sensor enclosure. The fixture does not allow for 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.



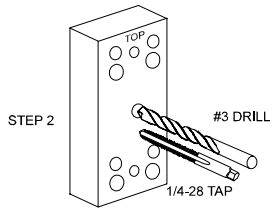
STEP 8 Remove the fixture and repeat Steps 1-7 for each additional sensor mounting position.

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.

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

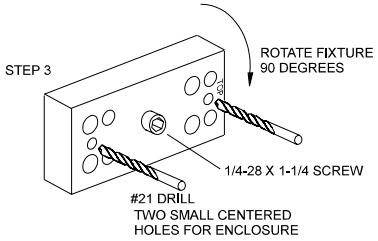
WELD PAD METHOD FOR MOUNTING SENSORS

BE SURE THE SENSOR LOCATION FOLLOWS THE BEST LOCATION DESCRIBED ON THE PREVIOUS PAGES.

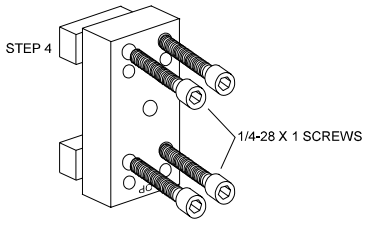


STEP 1 Remove all paint, grease, and or rust from surface to be welded. (Surface should be flat T.I.R. 1/32 of an inch.)

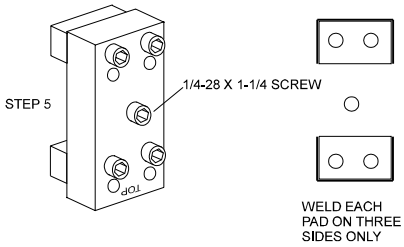
STEP 2 Drill and tap the center hole for mounting the fixture to the press member. This hole should be ½ inch deep. (Optional)



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)

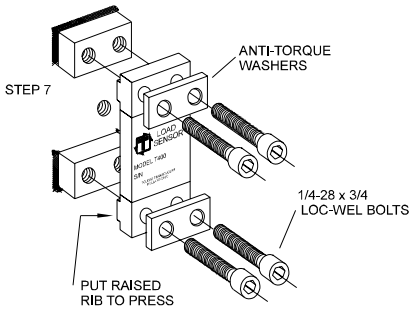


STEP 4 Remove the fixture from the press member. Bolt the weld pads to the fixture with ¼-28 by 1 inch long socket head cap screws provided. Reattach the fixture with the weld pads bolted on using the center hole as in Step 3. Orient the fixture as shown.



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.

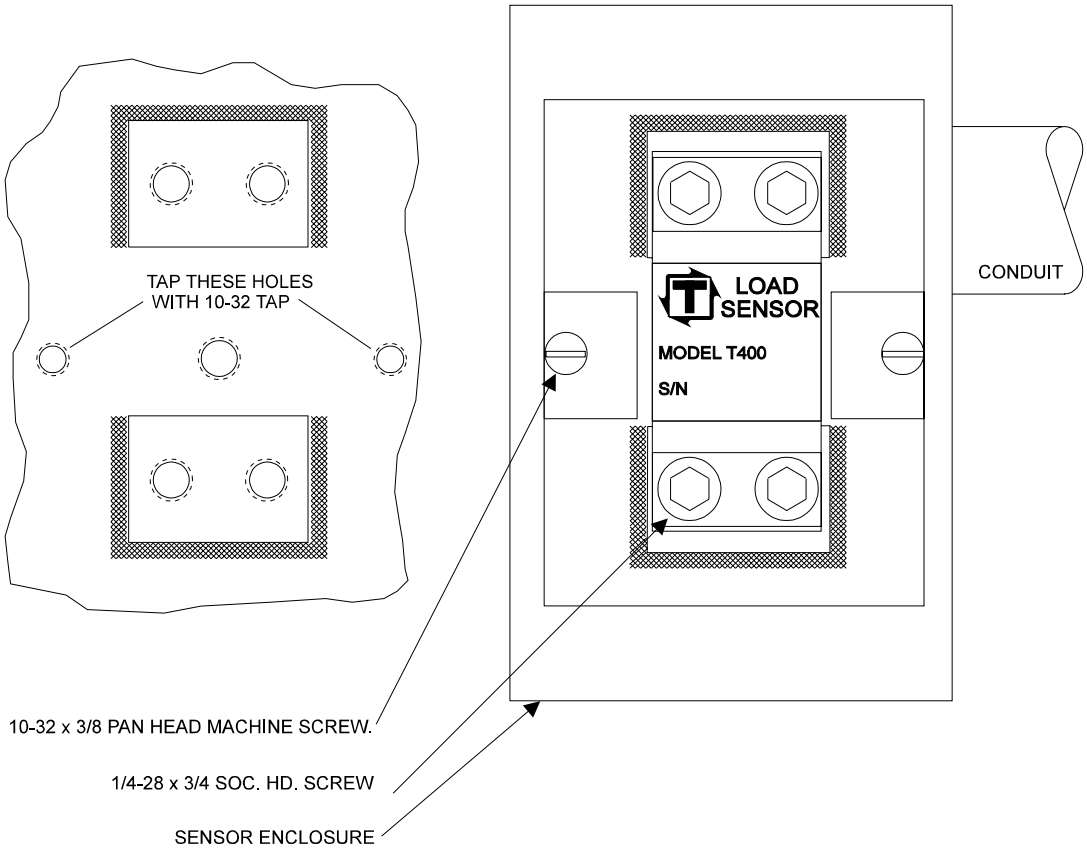


STEP 7 Mount the sensor with the raised rib to the press. The anti-torque washers should go between the screw and the sensor body. Torque each ¼-28 x ¾ in. long socket head screw to 150 LB.-IN or 12.5 LB.-FT.

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.



TOLEDO TRANSDUCERS, INC **PRESS CALIBRATION TEST DATA** HOLLAND, OHIO U.S.A.

COMPANY: _____ **DATE:** _____

_____ **PRESS SERIAL No:** _____

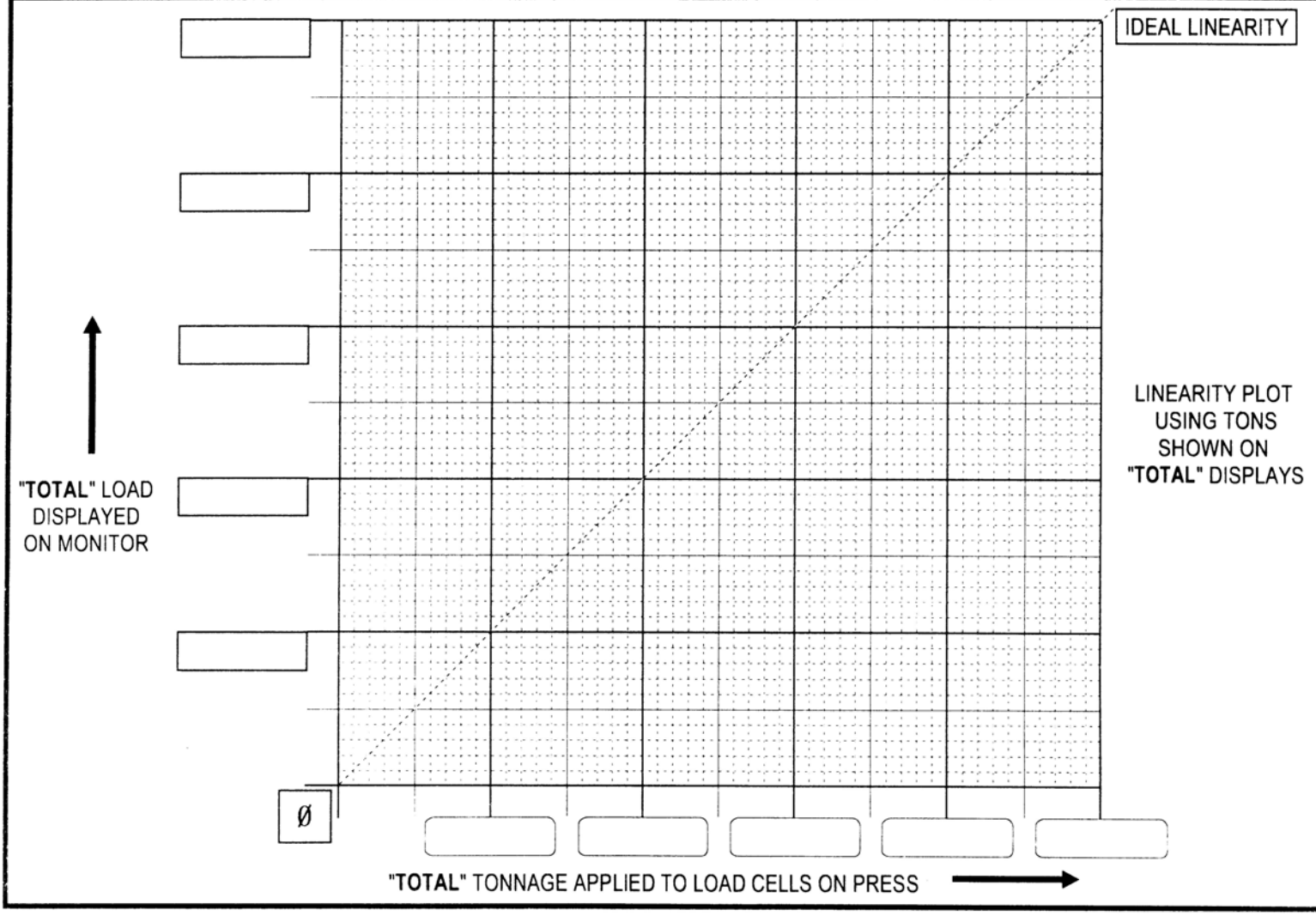
_____ **PRESS (Type and & No.):** _____

CONTACT: _____ **PRESS CAPACITY:** _____

PHONE: (____) _____ **LOAD MONITOR MODEL:** _____

SERVICE ORDER #: _____ **MONITOR SERIAL No.** _____

SLIDE-ADJUST INDICATOR	TONNAGE APPLIED TO **LOAD CELLS** ON PRESS	TONNAGE DISPLAYED ON **LOAD MONITOR**
	LR / TOTAL / RR LF / RF	LR / TOTAL / RR LF / RF
	LR / TOTAL / RR LF / RF	LR / TOTAL / RR LF / RF
	LR / TOTAL / RR LF / RF	LR / TOTAL / RR LF / RF
	LR / TOTAL / RR LF / RF	LR / TOTAL / RR LF / RF



DRAW IN :

- CHANNEL NUMBER
- SENSOR LOCATION
- MONITOR LOCATION
- LOAD CELL LOCATION
- DIRECTION OF MATL. FLOW

SHUNT RESISTORS:

ONE MEG ? YES ___ NO___

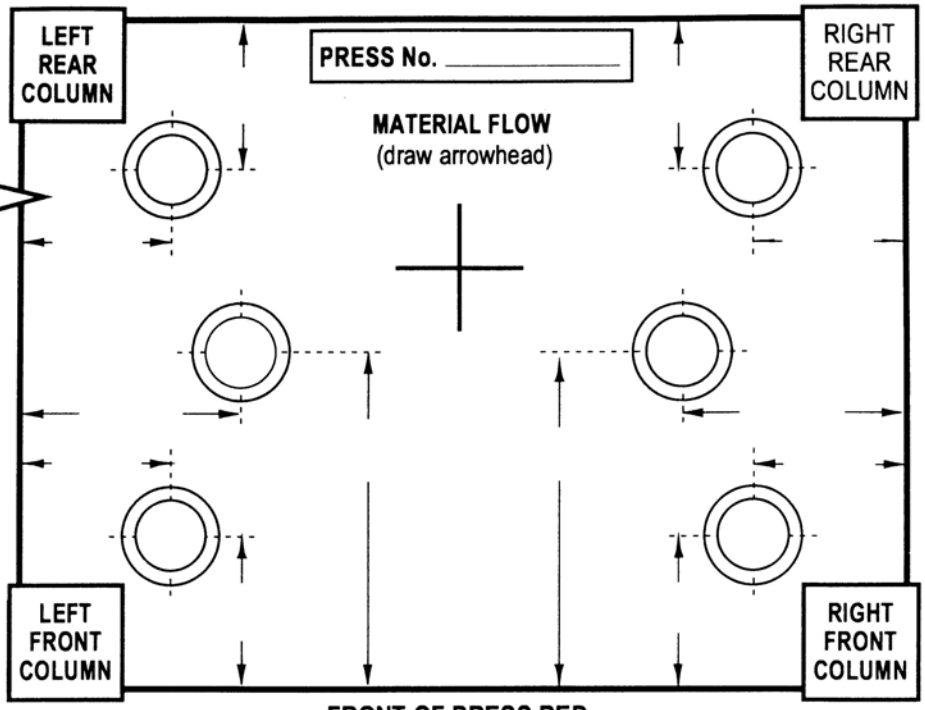
OTHER RESISTORS:

CHAN. 1 _____

CHAN. 2 _____

CHAN. 3 _____

CHAN. 4 _____



FRONT OF PRESS BED

TYPE OF LOAD CELLS: _____ **TYPE OF LOAD CELL READOUT:** _____

TONNAGE SENSORS

SENSOR NUMBER	SERIAL NO.	CAL. NO.	X 10	LOCATION (LF, RF, LR, RR)
1				
2				
3				
4				

CALIBRATION LOAD CELLS

CELL NUMBER	CAPACITY TONS	SERIAL NO.	CAL. NO.
①			
②			
③			
④			

CCM TYPE: _____ **CCM OFFSET:** _____ **STI REFERENCE NUMBER:** LOW: _____ HIGH: _____

STI DEGREES IN CHANNEL No. 1: _____

TRIGGERED FROM PROBE ? YES___ NO ___ (Show threshold value if not triggered from probe): _____

TRIPPED ALARM RELAY STOPS PRESS ? YES___ NO___ EXPLAIN: _____

ALL STICKERS AND DOCUMENTS FILLED OUT ? YES___ NO___ **IF NOT, EXPLAIN WHY:** _____

TFP No.: HIGH 2____ LOW 2 ____ HIGH 4 ____ LOW 4 ____ HIGH 6____ LOW 6____ HIGH 8____ LOW 8 ____

COMMENTS: _____

TESTS MADE BY: _____ **TESTS ACCEPTED BY:** _____ **DATE:** _____

MAIL ADDRESS:

TOLEDO TRANSDUCERS, INC.
P.O. BOX 10
HOLLAND, OHIO 43528

SHIPPING ADDRESS:

TOLEDO TRANSDUCERS, INC.
6834 SPRING VALLEY DR.
HOLLAND, OHIO 43528

PHONE: 1 (419) 867-4170
FAX: 1 (419) 867-4180

TOLEDO TRANSDUCERS, INC **PRESS CALIBRATION TEST DATA** HOLLAND, OHIO U.S.A.

COMPANY: _____ **DATE:** _____

_____ **PRESS SERIAL No:** _____

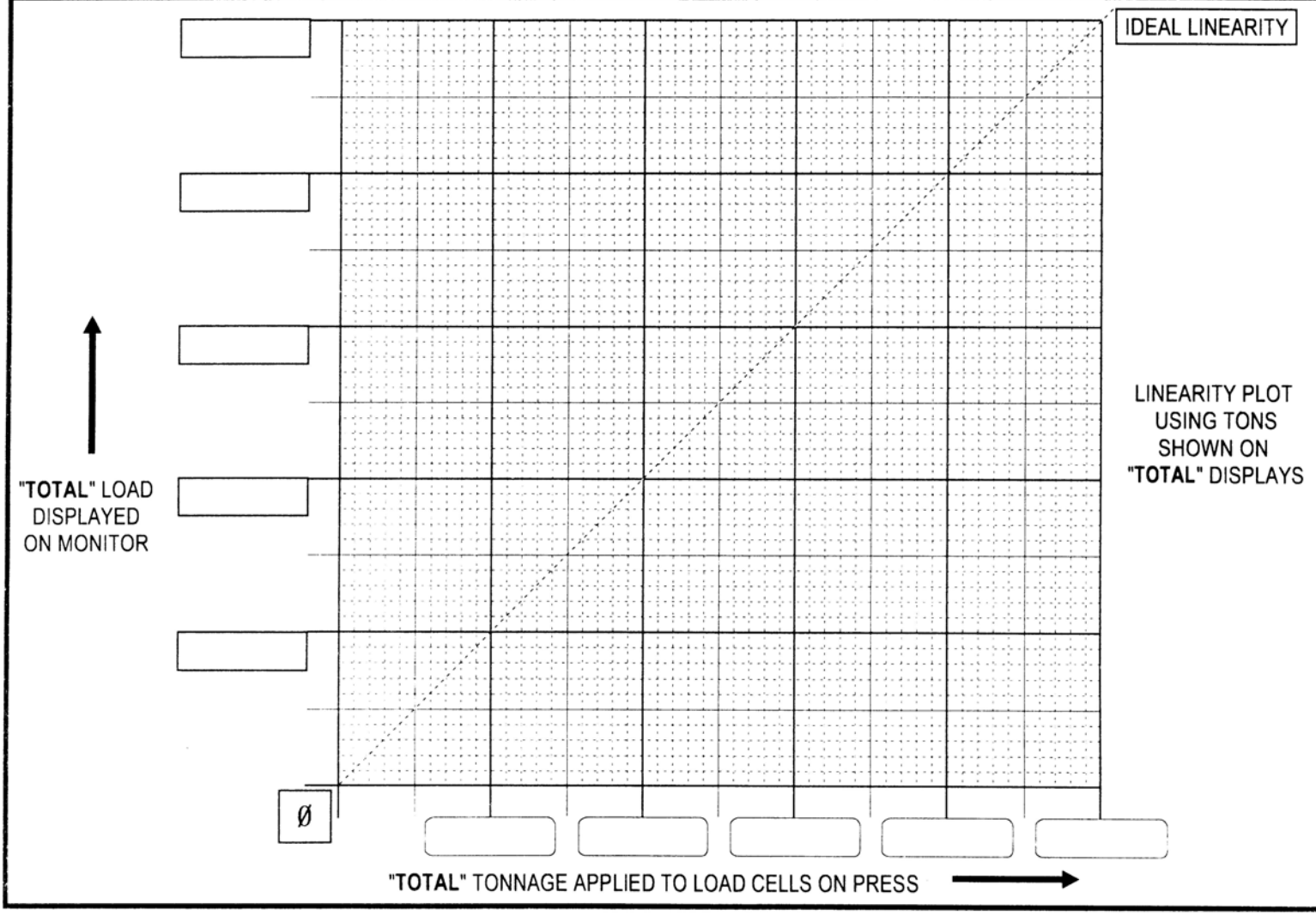
_____ **PRESS (Type and & No.):** _____

CONTACT: _____ **PRESS CAPACITY:** _____

PHONE: (____) _____ **LOAD MONITOR MODEL:** _____

SERVICE ORDER #: _____ **MONITOR SERIAL No.** _____

SLIDE-ADJUST INDICATOR	TONNAGE APPLIED TO **LOAD CELLS** ON PRESS	TONNAGE DISPLAYED ON **LOAD MONITOR**
	LR / TOTAL / RR LF / RF	LR / TOTAL / RR LF / RF
	LR / TOTAL / RR LF / RF	LR / TOTAL / RR LF / RF
	LR / TOTAL / RR LF / RF	LR / TOTAL / RR LF / RF
	LR / TOTAL / RR LF / RF	LR / TOTAL / RR LF / RF



DRAW IN :

- CHANNEL NUMBER
- SENSOR LOCATION
- MONITOR LOCATION
- LOAD CELL LOCATION
- DIRECTION OF MATL. FLOW

SHUNT RESISTORS:

ONE MEG ? YES ___ NO___

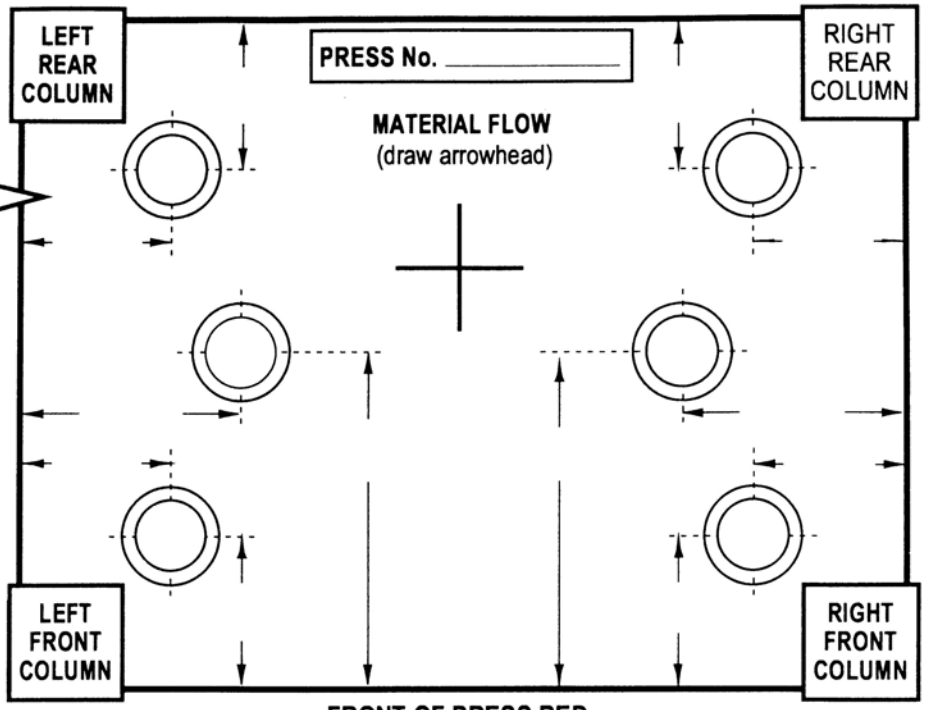
OTHER RESISTORS:

CHAN. 1 _____

CHAN. 2 _____

CHAN. 3 _____

CHAN. 4 _____



FRONT OF PRESS BED

TYPE OF LOAD CELLS: _____ **TYPE OF LOAD CELL READOUT:** _____

TONNAGE SENSORS

SENSOR NUMBER	SERIAL NO.	CAL. NO.	X 10	LOCATION (LF, RF, LR, RR)
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CALIBRATION LOAD CELLS

CELL NUMBER	CAPACITY TONS	SERIAL NO.	CAL. NO.
①			
②			
③			
④			

CCM TYPE: _____ **CCM OFFSET:** _____ **STI REFERENCE NUMBER:** LOW: _____ HIGH: _____

STI DEGREES IN CHANNEL No. 1: _____

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TRIPPED ALARM RELAY STOPS PRESS ? YES___ NO___ EXPLAIN: _____

ALL STICKERS AND DOCUMENTS FILLED OUT ? YES___ NO___ **IF NOT, EXPLAIN WHY:** _____

TFP No.: HIGH 2____ LOW 2 ____ HIGH 4 ____ LOW 4 ____ HIGH 6____ LOW 6____ HIGH 8____ LOW 8 ____

COMMENTS: _____

TESTS MADE BY: _____ **TESTS ACCEPTED BY:** _____ **DATE:** _____

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